The Builder.

VOL. LXII. No. 2857. SATURDAY, FEBRUARY 6 1892.

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The Science of Construction.

WHATEVER differences of opinion may be held as to the use or desirability of examination for architectural students, we imagine there would be practical unanimity among all classes of architects as to the importance of education, and the strongest advocate of the architect's position as an artist would be constrained to admit the necessity of a certain amount of scientific training for those who, whatever their genius may be for artistic designing, are constrained by the very nature of their calling to be constructors. The constructive problems which have to be faced and worked out even in a small building are of a far more complicated nature than is apparent at first sight, and although a few years' experience will enable a man to gain such an amount of practical acquaintance with the materials which he uses that he will avoid gross blunders, yet without scientific training he will never be able to explain even to himself the reason for preferring one form to another, nor will he understand why under certain conditions materials behave in a very different manner from that which characterises them under other conditions. The "rule of thumb," which is the watchword of the severely practical man, is generally safe, but eminently unscientific, because it is useless to meet new conditions, and when these arise the practical man adopts another rule, which he defines as "being on the safe side," the result of which is generally safety at the cost of wastefulness. The evils of theoretical knowledge alone, unchecked by practical experience, are, of course, obvious, and would be far more likely to have dangerous effects, particularly with those who have to carry out designs; but in the case of the architect, who must be the designer not only of beautiful forms and harmonious arrangements, but also of strong and stable structures, we hold that he cannot afford to neglect the theory any more than the practice of his art. The accurate determination of the conditions upon which depend the strength and the stability of structures requires, in many cases, a knowledge of advanced mathematics which is probably never possessed by ninety-five per cent. of students of architecture; and a generation or so ago, no attempt had been made to approach the elucidation of such problems from any but the mathematical side. As a consequence, the whole of this portion of his educational equipment was practically a sealed book to the architectural student, who was compelled to take on trust a number of formulæ and tables without the slightest knowledge of the principles on which they were based. Whatever else the institution of examinations by various bodies may have done or not done, it has undoubtedly created a demand for science text-books on building construction suited to the comprehension of those who are unacquainted with advanced mathematics. Among the best of these are the "Notes on Building Construction," the first three parts of which were originally published by Messrs. Rivingtons, and have been noticed by us on more than one occasion. The fourth part of this work is now before us.*

We cannot recall a case where a work of this importance has been published anonymously, and we regret to notice from the preface that the author has been compelled by ill-health to depute a considerable portion of his work to an anonymous friend. Although he modestly states that by this arrangement "he feels he has conferred a great benefit on his readers," we cannot help feeling that in parts the work shows signs of negligence, and we shall be compelled to note some instances where the want of careful revision is sadly manifest. We consider the scheme of the book altogether admirable, the object being not only to give the various formulæ for calculating the dimensions of beams, girders, &c., but to explain fully the reasons for the use of these formulæ, and to show how graphic methods can be used for their solution with much less chance of error than abstruse mathematical calculations. The detailed manner in which the various problems are worked out, and the number of examples given, abundantly justify the publication of this portion of the work as a separate volume, for it is quite evident that it could not have been incorporated with the volume on materials without rendering it altogether too bulky.

The first chapter explains the terms in general use, such as live and dead load, breaking load, &c., the various stresses which act upon bodies, the strains in the bodies set up by these stresses, and the modes of fracture, and such expressions as the "modulus of elasticity," which is the quotient obtained by dividing the stress per unit of area by the strain, being generally expressed in pounds per square inch; or, in other words, it is the weight that would be required to stretch a rod of one square inch sectional area to double its length, supposing it did not break. The subject of equilibrium is next treated; the diagrams explaining how the re-actions at the points of support are ascertained as soon as the position of the load is known with reference to the supports are very clear, and a student carefully reading these remarks cannot fail to gain a clear insight into the subject. The determination of the external forces acting upon a structure and their re-action is generally simple enough, and the real difficulty of understanding the theory of the resisting power of materials comes in when the equilibration of the bending moment with the moment of resistance at any section of a beam is investigated; in other words, when the internal stresses produced by the action of the external forces are considered, and the way in which the fibres of the material resist these stresses. We are inclined to the opinion that the thorough elucidation of these problems can only be attained by the use of the Calculus, but after a very careful perusal of this portion of the book we are convinced that this is the clearest and most successful attempt that has been made to fully explain them in a simple manner that can be understood by the ordinary student. The terms in use, such as "neutral axis," "modulus of rupture," "shearing stress," and others, are

* "Notes on Building Construction." Arranged to meet the requirements of the Syllabus of the Science and Art Department of the Committee of Council on Education, South Kensington. Part IV. Calculations for Building Structures. Course for Honours. London: Longmans, Green & Co. 1891

explained, graphic representations being always given alongside the ordinary figures, showing the varying position and distribution of loads on a simple beam. The student will easily learn how to delineate the figures, and he will, moreover, see for himself the reason why,—to take one example only,—a distributed load over a beam exerts only half the effect on it that the same load concentrated does. The difference between *strength* and *stiffness* is clearly described, and the formulæ for deflection are investigated as thoroughly as is necessary. The authors in this portion of the book have been compelled to touch the fringe of advanced mathematics, and as they are obliged to use the term, "moment of inertia," we think it would have been well to attempt some explanation of it, or the student will be hopelessly perplexed when he meets it. If a body be imagined as composed of an infinite number of minute particles, each of these particles is at a certain distance from the neutral axis of the body; if the weight of each particle be denoted by w, and its distance from the neutral axis by d_1 d_2 d_3, &c., then $wd_1^2 + wd_2^2 + wd_3^2 + \ldots . wd_n^2$, *i.e.*, the sum of the products of the weight of each particle by the square of its distance from the neutral axis is the "moment of inertia" of the body about that axis. It may possibly be objected that this explanation would not be of much value to the ordinary student; but even if this be so, we cannot think it right to introduce, without any attempt at elucidation, a term which by no means carries its meaning on the face of it. The effect of fixing the ends of beams, instead of merely supporting them, is excellently shown by diagrams, in which the points of contraflexure are very clearly indicated, and a careful study of these diagrams will be of the greatest possible use to the student; in fact, we are not aware of any other attempt to explain graphically the great difference in the curve of deflection of a beam caused by preventing its ends from tilting up. The diagrams to which we particularly refer are figs. 111 to 119. The next chapter is upon wrought-iron rolled beams, and the method of finding the moment of resistance of an I beam is fully and clearly shown. Cast-iron girders are next treated, but as the use of these has almost died out, and as the author himself observes that "the material of which they are made is so treacherous and uncertain that it is always necessary to use a large factor of safety," this chapter is not of very material use or interest.

The chapter on tension and compression bars is well written, and the reason why the calculation of the resistance of a compression bar is a much less simple problem than in the case of a tension bar is clearly shown, and it is easy to understand from the considerations here laid down what an important element in the strength of columns or struts a slight inequality of load constitutes, producing as it does irregularity of pressure, so that the stress never presses absolutely through the centre line. In this connexion we think the author should have made some reference to the experiments of Weyrauch, Bauschinger, and others, on the effect of variations in load, as formulæ of comparative simplicity have been deduced giving a means of obtaining from the quiescent stress what is called the vibration safe strength,—*i.e.*, the strength of pieces when subjected to alternate tension and compression. It is true that early in the book Wöhler's tests are barely alluded to, but the whole question is of so much interest and importance that it should have been treated at greater length. The element of uncertainty with regard to columns and struts has evidently sorely tried those investigators who have endeavoured to make one formula apply to all cases, for in an example worked out on page 115 from the various formulæ which are given, the results vary to the extent of 500 per cent., and it is not surprising that one of the most recent experimenters, Prof. Fidler, C.E., has come to the conclusion "that the strength of columns cannot be defined by any hard-and-fast line." Rivetted and other joints, both in wood and in iron, are explained, and we are glad to find that pin joints have received adequate attention, for the increasing use of iron roofs renders it very desirable that this form of connexion should be clearly understood; and the calculations for a large plate-girder are very fully worked out, with graphic delineations of the bending moments. Ample attention is given to framed and braced structures such as roofs, and the method of drawing the stress diagrams suggested by Professor Clerk-Maxwell is explained. We should have been glad to find here a more detailed reference to and explanation of Bow's system of notation, which is so excellently adapted to all structures, whether simple or complex, and, when once mastered, simplifies calculations immensely. This is only shortly noticed in one of the appendices. Numerous examples are worked out in a large number of diagrams, some of which are in plates at the end of the work, but these have been generally so arranged that they can be unfolded and read simultaneously with the letterpress referring to them. This is a matter of no small importance. The conditions of stability of brickwork and masonry structures are investigated, such as chimney-stacks, retaining walls and arches, the diagrams illustrating the latter being to a large scale and very clearly drawn; and the last chapter treats of the motion of fluids in pipes. We should have been glad to see a few pages devoted to the motion of gases and the calculations of the sizes of pipes required for gas supply, as these are not readily attainable.

At the end of the book are a series of useful appendices, of which No. 11 seems particularly valuable; but we are not quite sure whether the last—No. 21—is not somewhat dangerous. For ourselves, we should prefer to keep in the memory the various formulæ in the forms in which they are generally used; for if one sometimes uses a formula for the strength of beams, for example, in which the length is taken in inches, and the result comes out in pounds; and at other times the same formula, altered so that the length is in feet and the result in hundredweights, the chances of error are increased. A number of most useful tables are given, which appear, as far as we have tested them, carefully drawn up; but has not the author given much too high figures for the moduli of rupture of various woods in Table I.? Certainly, if the experiments carried out by Mr. Lanza in the United States are correct, these figures should be reduced. We must also say that, practically, we should scarcely be satisfied with the dimensions given on p. 340 for the tie-beams and principals of wooden roofs, even though they carried no ceiling.

We have already stated that the author has wisely given a number of examples in which the application of the rules of formulæ is illustrated by working out the calculations in detail, and there is nothing more useful to the student than studying such examples, as without their help he would be likely to flounder hopelessly. In such a work as this the greatest possible care is required to ensure accuracy, as there is nothing in the context to suggest the rectification of errors, and we regret to notice some serious inaccuracies which are evidently due to carelessness, and which will mightily perplex the conscientious student. We do not profess to have checked a tenth part of the calculations; but we feel compelled to call attention to the fact that in a future edition,—which we have little doubt will soon be called for,—the whole of these examples must be carefully revised. For example, the use of the sign of addition instead of that of multiplication occurs far too often, the position of the decimal point is wrong in some cases, and many other small errors will be found; but on page 79 there occurs an accumulation of blunders that is quite inexplicable. We refer to example 6, where 20 ft. is said to equal 120 in.; 1,100 lbs. is put down as the modulus of rupture, instead of 11,000; the safe load is calculated at "about 3 tons," whereas, if the figures actually put down are worked out, the result is 11 tons 16 cwt., while the correct answer is 5 tons 18 cwt.!!

Again, on pages 84 and 85, the introduction of the letter n into the description of the stress area (shown graphically) of the flange only of a rolled-iron joist, makes it quite wrong, and would puzzle a student very much. On page 91, example 10, in calculating the deflection of a beam by the formula $\Delta = \frac{n\,W\,l^3}{E\,I}$ when W is the *total* load on the beam, the serious error is made of putting for W the load per inch-run. In several cases we notice that the scale of the diagrams is stated to be $\frac{1}{8}$ in. = 1 ft., when it is really $\frac{1}{8}$ full size. Seriously, these errors—and we have not exhausted the list—ought not to have occurred, and it is because the book, as a whole, is so good, that we have called attention to them, in the hope that they will soon be rectified.

NOTES.

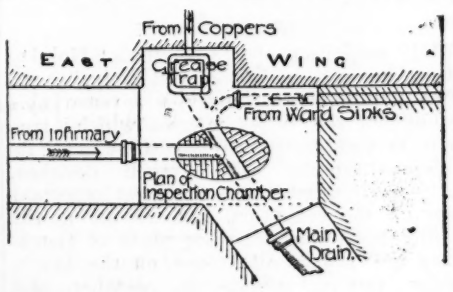
ANOTHER great labour dispute has broken out in the North, originating in the apportionment of work between two branches of the engineering trades. The number actually on strike is variously stated at from 6,000 to 8,000, but only a small proportion of the strikers are really concerned with the matter in dispute. It is understood that the same question has previously been referred to arbitration, but the struggle has recommenced in consequence of dissatisfaction with the arbitrator's decision on the part of some of those affected. There is still much friction at the shipbuilding yards with regard to the old-standing question of overtime, and, although the dispute as to distribution of work seems to have been the pretext for all the strikes which have taken place during this last week, there is every probability that the former question will also be forced into prominence before work is resumed. It would be well for the strikers to consider the arguments put forward by Earl Ravensworth at the annual meeting of the North of England Steamship Owners' Association last week. There is no doubt that the present position and outlook of our trade points to a shrinkage in wages; and the maintenance of harmonious relations between capital and labour is one of the principal safeguards against this state of things becoming still more serious. The ostensible cause of the present dispute is eminently one for arbitration, and the strike is a great mistake,—especially on the part of those who are participating without any grievance of their own. The trades unions are apparently very sensitive and imaginative, one society having passed a resolution on Saturday approving of the strike on the ground that "we believe the employers are anxious to deal a blow at the organisation which dares to do battle for our trade." The "sympathy" of affiliated industries which would be highly commendable under some circumstances is now leading them to the unreasonable length of driving work out of their own yards, without any regard to the relations existing between themselves and their employers. Ill-feeling will inevitably ensue, as the consequences are sure to be disastrous to some employers with whom there is no ground for quarrel. A reckless disregard is shown for the prosperity of the district as a whole, for the coal trade and the carrying and other industries will necessarily be seriously affected by the stoppage, and it is, indeed, difficult to say where the mischief may end. Strong condemnation of strikes and lock-outs at the present time has been expressed at mass meetings in Newcastle, the men themselves being anything but unanimous as to coming out.

THE recently-issued "Second Annual Report of the Geological Survey of Texas," 1891, contains some exhaustive particulars of the different kinds of building

stone found in the State. Granites, used for building, occur in two areas,—the Central Mineral Region, and in the extreme west, or Trans-Pecos Texas. The best-known granite in the first-mentioned area is red to dark reddish-grey, varying from fine to rather coarse grain in structure, and susceptible of a high polish; it was used in the construction of the Capitol building. The outcrop of the granite, which can be quarried to any desired dimensions, covers an area of more than 100 square miles. In the northern part of Gillespie county there is a brownish granite of very fine grain, and others varying in colour from light to dark grey, well adapted for building purposes. The granites of Trans-Pecos Texas lack the variety of colour which is found in those of the central region. They are all near good railway accommodation, however. Porphyries of almost every shade and colour abound also in the western portions of the State. Amongst the marbles, that known as Austin is the most noteworthy; it is quarried from the Cretaceous formation. The body of the stone when polished is of a light yellow colour, and the tracings of the contained fossil shells in pure calcite imparts to it a very pleasing effect. The Carboniferous limestones of the northern part of the State also produce good marbles; and those known as "Burnet," from the Silurian are pink, white, buff, blue, and grey in tint. Abundant marble, destined some day to become the basis of a great commercial industry, is found in the Carrizos and Quitman mountains; it is banded or striped and clouded, as well as pure white. "Some of them," says the State geologist, "when polished will rival the Aragonite or Mexican Onyx in delicacy of colouring." The limestones of Texas suitable for building purposes are abundant and widespread in their occurrence; the best cretaceous limestone is that from the Fredericksburg and Washita divisions, which varies from white to yellow. The area of the central coalfield produces excellent building sandstone, which is extensively utilised; and the Central Mineral district furnishes good slate for roofing purposes. As a test for durability,—of building stone it is stated that, if in the field, a bed of stone under examination is entirely hidden from observation by the material of its own destruction, it will prove to be a stone that will suffer greatly on exposure; but if it stands out in bold escarpments whilst the other part of the strata are decomposed, it shows that it has a strong power to resist atmospheric influences. This may be very well as a rough-and-ready rule, but it certainly does not always apply. The method adopted in describing the building stones in the work alluded to might very well serve as a pattern to geological surveyors on this side of the Atlantic. The majority of the Geological Surveys of the United States, recognising the fact that they have been constituted to collect geological information of commercial value, carry out their work in that spirit; let us hope that the Geological Surveys of Great Britain, now that they have given us good geological maps and philosophic descriptions of the strata, &c., will shortly turn their attention also to the practical aspect of their science. There is a wide field open before them, and the public might then get some adequate return for the large sums of money annually disbursed for the purpose, from which but little result has hitherto accrued.

THE lecture on "Dust" delivered by Dr. Pridgin Teale at the Society of Arts on Wednesday evening was intended evidently as the first suggestion of a new sanitary campaign against the admission of dust into our houses. The lecture consisted mainly of an exposition of the means which have been adopted by Dr. Teale for some time past to regulate the movement and settling of dust. He pointed out in the first place that the access of dust into receptacles, such as cupboards and closets, arose from the constant changes of temperature and barometrical pressure in the atmosphere, which caused frequent currents of the air in and out through crevices and the interstices of doorways, carrying the dust with them and depositing it as the air settled. Shortly stated, Dr. Teale's principle is to stop out the air from all access to a closet or box save through one aperture, of an area in proportion to the internal space to be protected, and filling that aperture with a dust-filter, cotton-wool being the most efficient of various materials experimented on. To carry out the method requires very good workmanship and fitting of doors, and the application of air-excluding strips of soft material at the sides of doors and windows. The application of the method to keep dust out of drawers, boxes, and closets is proposed to be further extended to keep it out of houses, by similar treatment of the windows. The sash window must be given up, as not sufficiently controllable in regard to access of air, and windows formed with the greater portion fixed, and only a tall narrow sash hinged to open as a casement, and protected in the same way as closet-doors and boxes. This, of course, presupposes a special admission of air through ventilators, which are also to be protected by dust-filters. As far as concerns the exclusion of dust from closets and drawers where papers may have to remain a long time undisturbed, the suggestions are perfectly practical, and the demonstration of the results of the method incontestable. The exclusion of dust from the whole house is another matter. Some of the dust is created within the house, by decay and other causes; Dr. Teale affirms that most of the dust in towns is connected with smoke, but we think he attributes too large a proportion to this cause; and it is obviously of no use to have elaborate methods for keeping out dust if any considerable part of it arises within. The adoption of his principle for the whole house would mean an amount of delicate and costly work which cannot generally be afforded; a degree of care and supervision which would only be given by those who had an anti-dust "fad"; and, last but not least, a practical stoppage of direct fresh air through open windows. This latter, from a sanitary point of view, would be a worse evil than the dust, and we will never listen to any suggestion which is to interfere with the free opening of windows to the outer air. For the exclusion of dust from the house, therefore, we think Dr. Teale's method can hardly be regarded as "within the region of practical politics." For the exclusion of dust from store-closets, boxes and drawers it is perfectly practicable and may be very valuable, and the thanks of the community are due to Dr. Teale, in this as in so many other cases, for his investigations as well as for his clear and lucid exposition of the results.

A REPORT on the recent outbreak of enteric fever at the Foundling Hospital, by Dr. Sykes, the Medical Officer to the St. Pancras Vestry, gives an instructive account of the search made throughout the premises for any probable cause of disease, and the unexpected cause to which it was ultimately traced. The annexed plan, copied from one of the diagrams published with the report, explains the circumstances from which the disease originated. The grease-trap shown on



the plan discharged into the inspection-chamber through a pipe with the end dipped into the grease-trap to form a seal. Excreta were found in the grease-trap, and it was discovered that the periodical discharge of an automatic flush-tank down the infirmary drain caused a backwash into the grease-trap, the flush of water coming faster into the inspection-chamber than it could get away, and some of the contents of the drain were thus washed over into the grease-trap. The grease-trap took the discharge from the coppers in the kitchen, and on filling it with a charge of ammonia and peppermint it was found that the smell in a few minutes rose from the coppers and thence permeated a great part of the building. Dr. Sykes observes,

"This grease-trap was even a better incubation-chamber than the suspected water-cistern in the warm lumber-room. The warmth from the hot-copper water, the restricted and confined air supply, the nutritive material discharged into the trap, the access of infected fœcal matter, the fermentation set up, and the rush of the warm expanded air and vapour through the copper pipes and copper into the kitchen, the offices, and the staircases, are all factors favourable to the cultivation of infective matter, and to its diffusion by vapours covered by the odour of cookery."

It may be added that the pipe from the ward sinks (see plan) which also acted as a ventilating pipe to the inspection-chamber, was connected into the drain and untrapped, and may thus have assisted in leading up effluvia through the sinks; but the main evil was the close connexion of the grease-trap with the inspection-chamber on one side and with the interior of the kitchen on the other side.

THE Borough of Nottingham has issued an excellent coloured chart illustrating the relation of the number of deaths from various causes to the principal meteorological conditions on each day of the year 1891. The chart and tables of rainfall are very well got up, and the example here set might be followed with advantage by other Corporations and County Councils. The study of the results in detail is of course rather a matter for a medical journal than for our columns.

WE opened the *Fortnightly* this month with some curiosity on finding that it contained an article by Professor William Crookes, F.R.S., on "Some Possibilities of Electricity." The learned Professor had somewhat astonished the electrical world last November, in an after-dinner speech, by saying that "it has been computed that in every single cubic foot of ether there are locked up 10,000 foot-tons of energy which has hitherto escaped notice;" and we naturally expected that we might find in his article in the *Fortnightly* some explanation of this hard saying. We were, however, disappointed. The article covers much the same ground as the speech, though, of course, addressed to a larger audience. It deals with Professors Lodge and Hertz's investigations of electrical vibrations of ether, and anticipates the time when they may be made use of to telegraph without posts or wires. It alludes to Tesla's experiments with rapidly alternating currents, and points out the great possible gain in obtaining light, with far less heat, and, therefore, with far less expenditure of energy. There is also some Utopian talk of dissipation of fogs, controlling the weather, &c., and with it the very practical remark that the electro-static machine can no longer be regarded as a toy. But the 10,000 foot-tons have disappeared with the ether whence they came. Professor Crookes supplies us instead with another riddle; he tells us that the total *vis-viva* of sunlight per acre amounts to 800,000 horse-power per year, of which 3,200 horse-power are used by the crops. If Professor Crookes would only condescend to use words in their ordinary sense, we might make out what he means by this; at present it is much as though he were to tell us that the rainfall is equal to the speed of an express train. The article is pleasantly and easily written, and we find in it occasional gleams of transatlantic humour. Perhaps more of it than we suppose is intended to be taken humorously, which would account for much. The Professor's interest

in psychical theories is well known, consequently we are not astonished to find thought-transference and brain-waves cropping up again, this time with the suggestion that the brain-waves are electrical.

IN a recent correspondence with the County Council, the St. Saviour's (Southwark) Board of Works have moved for a removal of the bars and gates which of late years have obstructed traffic through Montague-close. A way formerly led north of the church to Pepper stairs, High-street, and (old) London Bridge. Like the Mint, and the neighbouring Deadman's-place (now Park-street) and Clink, the close has been a sanctuary, privileged, it is said, from the circumstance that Lord Monteagle lived there when he received the letter that betrayed Guy Fawkes. But the facts, as set forth in the *Archæologia*, vol. xii. 200-11, by no means support the tradition*; and confusion has arisen between the names of Montague and Monteagle. At the suppression the priory, with the close, the church of St. Mary Magdalen, and appurtenances, its income being valued at 624*l.* 6s. 6d., was granted to Sir Anthony Browne, Henry VIII.'s Master of the Horse, whose son was elevated Viscount Montague. This family were staunch Catholics, and the close became to be known as "Little Rome." In the "Gentleman's Magazine," September, 1808, is a view of the house they built in the close; taken down in November, 1828. It stood close against the church's north side, for in the parish books for 1596 is an entry for making a new door in the church wall entering into my Lord Montacute's house. John Carter carefully inspected the remains of the conventual buildings in 1797 and 1808. Allen, twenty years later, describes the then state of a crypt standing north and south, measuring 100 ft. by 25 ft., with two aisles, and a groined roof supported by octangular columns. Over this extended a spacious room, which retained traces of an open timber roof. Some exterior corbels carried fragments of groin-springing, probably of the cloister.† But all above ground remains, together with the two quaint rows of Alice Overman's almshouses, gave place before the large warehouses and the Bridge House Hotel, planned and designed, 1838, by George Allen, architect. The Guildhall Library contains several good views of portions of the close, with Montague House, and the main gateway at the western end of St. Saviour's.

A CORRESPONDENT writes: — "In regard to the proposed new clock for St. Paul's, we read that 'the old clock strikes the hours on the old "Phelps" bell, but the new one will strike upon "Great Paul," which is nearly 17 tons weight, with a hammer weighing 680 lbs.' Is it wise to run the risk of damaging the best and soundest bell in the British Empire by smashing a 680 lbs. hammer upon it every hour? I should like to see in print a certificate from Mr. Taylor, of Loughborough, the designer and successful founder, that he desires 'Great Paul' to be thus rudely treated; so that, when the bell gets cracked, the blame can be apportioned in the right quarter."

FROM some correspondence which has taken place in the *Manchester Guardian* it is evident that our remarks concerning the Whitworth Institute competition and the policy of privacy in regard to it are entirely in accordance with local feeling on the subject. One correspondent comments on the fact that only twenty-three designs were sent in, although the scale and importance of the building as proposed were such that it should have been one of the great competitions of the day. In reply to this, Mr. E. Salomons, the President of the Manchester Society of Architects, writes that the conditions imposed upon competitors were such that he for one felt quite unable, consistently with professional self-respect, to send in designs, and that he presumed others had the same feeling. It appears that, now that the designs are sent in on the scheme issued to competitors, the committee have changed their ideas, and that consequently the plans now sent in are useless. In that case the competing architects have certainly very strong right to complain. Competitions under the best circumstances involve an immense amount of wasted labour on the part of the architectural profession, and those who call upon architects for competing designs should at least make up their minds first what they are going to do, otherwise they are merely amusing themselves at the expense of the architects. If this present competition is really to be entirely abandoned, after the issue of an elaborate scheme of instructions, the committee ought to feel that it is incumbent on them, in common fairness (we might almost say in common honesty) to give some pecuniary compensation to the architects who have been tempted into wasting their time and labour to no purpose.

TO the February number of *A. A. Notes* Mr. W. B. Richmond contributes an excellent little paper on "Architecture from the painter's and sculptor's points of view," in which, so far from repeating a favourite theory of the moment, that architecture is nothing without sculpture, he emphasises the idea that architecture is *building*; that the business of the building is to be effective and impressive in itself without any aid from other arts; and that these can do little to redeem it if it is not in itself noble building. It is to be hoped that some of the architects who are so anxious to be sculptors, and to look down on unadorned building as uninformed with art, will duly consider this counsel from an artist who is not an architect, but who sees more art in architecture pure and simple than some architects seem able to find in it. "Give us," he says to the architects, "works of art as builders. And when you have done that, then we sculptors and painters will try in our way to help, not mar your work, which, if it is very good indeed, will need neither sculpture nor painting to make it perfect art."

MISS EUGÉNIE SELLERS is to give six afternoon lectures on Greek sculpture at the British Museum on Wednesday, February 10, and the five succeeding Wednesdays. The lectures will deal with the development of sculpture and relief, and its technique, and Miss Sellers, we perceive from the prospectus, proposes to uphold the position that the Greeks "were masters of rhythm and symmetry but not of decoration." We certainly have been under the impression that the Parthenon frieze was the finest decorative bas-relief in existence, though it is in the wrong place in some respects. An extra lecture is to be given on March 23, on the horses and other animals of the Parthenon frieze, by Mrs. N. Cohen, who has made a special study of the subject.

THE exhibition of Mr. Wyllie's "Holiday Drawings in France and Italy," at the Fine Art Society's Gallery, is a remarkable example of the varied interest which a true artist may get out of a single scene in all its different aspects. The French sketches, sixty-one in number, are the most important part of the collection, and are all at the fishing town and watering place of Berck. They are nearly all scenes on the beach, under varying aspects of weather, and with varied sketches of fisher-folk, visitors, and boats, but there is no sense of monotony in the sketches, almost everyone of which has its special interest. Two which are especially good are 15, an evening effect, and 18, the breakers on a breezy morning. A pleasant interest is given to the catalogue by a new method of presenting the subjects; instead of a series of dry titles, there is a picturesque account of the expedition and the place, signed "Marian A. Wyllie," and the number of the drawing which illustrates each sentence or allusion is given in the margin.

A COLLECTION of small oil paintings by Mr. Wimperis, "Rustic and Riverside Pictures" is on view at Messrs. Dowdeswell's Gallery. It consists principally of pictures of river and meadow scenery, and shows the breadth of treatment and the fine aërial effect which have always characterised this artist's work, but to those who have known Mr. Wimperis best by his water-colours it also suggests that he is best known so; his broad free style is essentially a water-colour style, and when transferred to oil it seems a little toneless and hard, the technique which brings out the best effects of water-colours not being equally applicable to the other vehicle. In the same gallery is a collection of "Pictures of London street life," by Mr. Chas. P. Sainton (the son of the late eminent violinist of that name), which, amid a good deal of *chic*, contains studies of street children which are natural and piquant, especially "A Siesta in Covent Garden" (9), "Street Arabs" (21), and "A Picnic in the heart of London" (27). In "Au revoir" (25), a study of a young lady stepping into a hansom, the artist has made a pretty little *genre* picture out of an everyday London incident.

THE case of "Morris *v.* Brinsmead and another" throws an interesting light, for the outside public, on the manner in which laudatory paragraphs in newspapers are managed in these days. Part of the plaintiff's claim against the defendants was for commission for getting paragraphs inserted in newspapers about their pianos. This is only one instance of what is continually going on in the Press in these days, in the way of notices of inventions, and a most discreditable thing it is to the English Press of to-day, which however is probably not worse and possibly much better in this respect than the Press of some other countries. The charge is not that papers will insert such puff paragraphs for direct payment, — few of them descend to that, though many of them will bargain for an advertisement in exchange for a "notice"; but inventors and patentees can get notices (written by themselves) into a journal by paying a man who is not officially on the staff of the paper, but who has credit with them and whose contributions are accepted without any troublesome questions being asked. They are people who are useful to the paper, in short, and are favoured accordingly. In the leading daily papers of the day there are constantly to be seen descriptions and recommendations of new inventions, which are in fact written by those who are commercially interested in them, and then appear to the confiding public as independent expressions of opinion on the part of the journal in which they are printed. "Puffs" of this kind are sent to us constantly by persons interested in building inventions; paragraphs describing the excellence and advantages of their own patents, and intended for insertion as "notices." It seems almost incredible sometimes that people should suppose that any editor would accept such barefaced puffs and give currency to them; but they are accepted in many quarters, either directly, or through being smuggled in by some one who has credit with the paper; and readers may take it for granted that not one in a hundred of the paragraphs on new inventions which "go the round of the papers" are the independent opinion of an independent person; they are the statements of persons commercially interested in the matter. The cause of this, in the case of the higher class of papers, is apparently sheer carelessness and an absence of the proper sense of responsibility. The

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* The letter, inscribed to "The lord Mow'teagle," was delivered to his footman "as he passed in the streete towards night"; the conspirators agreed to preserve Lord Montague and others, with, at Percy's request, the Earl of Northumberland and Lord Monteagle.

† See also Concanen and Morgan's book, 1795; the account by Carlos in the "Gentleman's Magazine," June, 1835; and "Old Southwark and its People," by Mr. Wm. Rendle, F.R.C.S., 1878.

plain rule ought to be that no one is allowed to write anonymously in a paper upon anything in which his own interests are concerned. Until that becomes a generally accepted principle, the readers of newspapers will do well to distrust all paragraphs recommending this or that invention.

LETTER FROM PARIS.

THE two grand balls, given every winter at the Hôtel de Ville by the Municipality of Paris, have had the attraction of an artistic novelty this year, as the public can now see, by the numerous electric lights, the Salle des Fêtes with its ornamental decorations; though the ceiling paintings of Benjamin Constant, Aimé Morot, and the other artists engaged, are still wanting. At the death of Lavastre, the ornamental work was undertaken by MM. Carpezat and Guifart, who have in fact only followed the scheme sketched out by their predecessor. The effect is very sumptuous, though it will look somewhat crude until the gold has toned down a little. At present, the eye finds no repose amid the crowding of bas-reliefs, medallions, statues, many-coloured emblems and escutcheons encumbering the too massive frames of the panels. This plethora of decoration makes one regret the more the Salle des Fêtes of the old Hôtel de Ville, as it used to appear at Imperial receptions, with its elegant decoration in pure Renaissance style. The ceiling was soberly treated in coffers and garlands, and the compositions with which Henri Lehmann had decorated the pendentives and the spaces of the vault formed an admirable frame to the paintings by Horace Vernet, Léon Cogniet, Ingres and Delacroix. Instead of these we have now the commonplace figures of M. Milliet, the uninteresting compositions of M. Aublet, and the ceiling by M. Gervex symbolising Music, the foreground occupied by an imaginary proscenium of a theatre, where the eye rests first on the realistic black dresses, lorgnettes, and bald heads of the occupants of a realistic orchestra.

"Fin de Siècle" is the expression that sums up the character of this decoration; nor can one admire more unreservedly the blue and red eccentricities of M. Besnard or the contorted torsos of M. Carrière, which are supposed to combine the drawing of Michelangelo with the chiaroscuro effect of Rembrandt. In the whole assemblage of work there is nothing really decorative except the large composition by M. Puvis de Chavannes, though it is to be hoped that the artist will modify the heavy effect of the mass of trees in the middle distance which seems to crush the figures. If he does away with this one fault his work will remain the dominant one in this curious collection of decorations, which impresses one somewhat like an orchestra in which each player is performing an independent part, with no reference to the others.

It is, therefore, gratifying to find that the Municipal Council have chosen this eminent artist to succeed Elie Delaunay in decorating the vault of the grand staircase; though M. Puvis de Chavannes has never before painted a ceiling, and his dislike to the task was with difficulty overcome. It will be interesting to see the result, and there is no doubt at all events that in this case the decorative painting will be subordinated to the lines of the architecture, both in design and colour.

The Paris municipality have been making a curious experiment, in giving a commission to M. Jules Cheret to design some cartoons for tapestry for the decoration of a room in the Hôtel de Ville. M. Cheret is well known for his designs of posters, with which he has covered many walls as well in Paris as in provincial towns. These very original works make quite a popular museum of art, and have almost revolutionised the art of the placard. The object of the commission is to obtain some tapestry designs with little delay, as it is useless to appeal to the majestic inertia of the Gobelins manufactory.

The "Cercle Artistique et Littéraire" of the Rue Volney has been first this year in the usual series of small winter exhibitions, and the collection is on the whole superior to its predecessors. Among the exhibits is a fine portrait of M. Henner by M. Carolus Duran, two beautiful portraits by M. Jules Lefebvre, other portraits by Rixens, Weerts, and E. Sani, landscapes by MM. Yon, Busson, Nozal, Félix Boucher, and a highly-coloured representation of the Ducal Palace at Venice by M. Benjamin-Constant. There is also M. Henner with his eternal blond figures, ivory on a black background; M. A. Maignan has painted a "Cigale" shivering in the snow, and M. Olivier Merson exhibits a set of important sketches for windows intended for the Church of Saint Adresse.

The Salon of Water-colour Artists has just opened its doors, we may find space on another occasion for a few words about it. We may just notice in passing a small but charming exhibition of landscape-paintings by a young artist, M. Paul Liot, collected at the Hôtel Bellevue, Avenue de l'Opéra, views in Normandy and sea-pieces. M. Pissaro, the impressionist artist, has also opened an exhibition of his works in the Durand Ruel gallery, which for some years past has rather made a specialty of artistic eccentricities.

We have mentioned already that in consequence of dissensions among the representatives of the late M. Meissonier the exhibition of his works has been given up. The quarrel is in fact about to come before a legal tribunal. On the one hand the widow of the painter wishes the paintings, sketches, and statuettes to be sold by public auction, while the children of the first marriage demand that the works of their father should be divided among the inheritors instead of being sold. Such seems to be the opinion of the magistrates, who consider that such a division was much more in accordance with the painter's wishes than a sale. The decision is, however, still pending. It is somewhat pitiful to see these wretched squabbles among the relatives of the great painter almost at the very moment when the anniversary of his death, according to Parisian custom, is being celebrated solemnly at the Madeleine.

A decree of the Minister of Instruction has regulated the mode of appointment of the architects of the Service des Monuments Historiques, who henceforth will be appointed by competition. The same decree announces that in future the Inspecteurs-Généraux in this service cannot be charged with the works carried on in a classified monument. An exception is made in favour of those who are actually carrying on such works at present on a commission dated prior to this decree. Another Ministerial decree provides for the creation, at the École Nationale des Beaux-Arts, of a course of history of French architecture in the Middle Ages and the Renaissance; a decision which will fill a deficiency long felt in the scheme of architectural education. We may add that the Minister of Instruction will shortly have to appoint a successor to Henriquel Dupont, who was professor of engraving in the École des Beaux-Arts.

A few particulars may be added as to the work of the École. On January 21 a committee, presided over by M. Ginain, gave the award in the competition entitled "Prix de Reconnaissance des Architectes Américains." The subject of the competition was "a mansion in a considerable number of storeys, similar to those in New York, Chicago, Boston, &c." After having examined nine designs submitted, the Committee awarded the prize to M. Deperthes (pupil of MM. Deperthes and Ginain). In the "Enseignement Simultané des Trois Arts" M. Binet, pupil of M. Laloux, has obtained a third medal for decorative design. In the competition in History a third medal has been awarded to MM. Goupy and Kohn, pupils of M. Reclou.

The Government some time ago commissioned four marble statues for the principal entry of the National Library, Rue de Richelieu. One of these statues has been recently erected, and gives a good promise for the decorative effect of the whole group when completed. It is the work of M. Hugues, and symbolises "La Gravure." The others, which are to complete the group, will represent "L'Imprimerie," "Les Médailles," and "Les Manuscrits."

The Louvre has acquired recently an interesting collection of sketches, among which is a study by Pierre Guérin, "Dido and Æneas," a splendid sketch by Ingres, and three masterly drawings by Géricault.

We have seen recently, at the atelier of M. Rodin, the clay model for the monument to Balzac to be placed in the Palais Royal. The author of the "Comédie Humaine" is represented standing, draped in a kind of monkish robe which he was accustomed to wear in his study, the arms crossed, the head raised and with an expression at once energetic and meditative. Not far from this statue will be placed those of Corneille and Racine, at the right and left of the entry to the Avenue de l'Opéra. The modern generation having, among so many statues, forgotten these two glories of French literature, the Municipal Council headed a public subscription for funds to arrange a competition for the execution of these two monuments.

The death is announced, at Paris, of a Swedish artist, Mdlle. Christine Lundberg, who came every winter to pursue her studies under M. Courtois and M. Raphaël Collin. She had exhibited, in the Salons of 1888, 1889 and 1890, portraits and *genre* subjects; and a picture of hers, "La Toilette," was in the Swedish section of the 1889 great Exhibition.

In the last issue of the *Builder* allusion was made to the death of Dupont, the celebrated engraver. Louis Pierre Henriquel Dupont was born in Paris in 1797, and has died therefore at the age of ninety-four. He studied painting first under the painter Pierre Guérin, and engraving under Bervie. At the age of twenty he had already obtained sufficient reputation to open an atelier which had an immediate success. He gave promise already of the qualities which have been predominant in his work; a rare correctness and a remarkable purity of style. He engraved most of the portraits painted by Ingres. He had some great successes with the works of Delaroche, and finally engraved his chef-d'œuvre, the "Hémicycle des Beaux-Arts," and subsequently "The Entombment of Christ," by the same painter. He also engraved various works by Ary Scheffer, Hersent, and Lehmann, and among his engravings from the old masters may be mentioned the "St. Catharine," after Correggio, and the "Walk to Emmaus," after Veronese. Among modern works which he interpreted may be mentioned also the portrait of the Baron de Rothschild by Hippolyte Flandrin, the "École Turque" after Decamp, and "Entry of Henri IV. into Paris," after Gérard.

Since 1849, Dupont was member of the Académie des Beaux-Arts, and had a multitude of medals at various exhibitions, and the cross of commander of the Legion of Honour. In 1863 he was appointed professor of engraving at the École des Beaux-Arts.

It is a long engraver's career of which the first plate dates from 1815. According to his express wish no discourse was pronounced over his tomb, nor any flowers or wreaths placed on it. But he remains honoured in memory as the last representative of that remarkable group of French artists of the earlier part of the century which included such names as those of Delaroche, Ingres, and Delacroix.

SARACENIC ARCHITECTURE.*

BY PROFESSOR AITCHISON, A.R.A.

I WILL begin at the beginning with the Kaaba. We heard in the last lecture that it is now about 40 ft. by 50 ft. on plan, of trapezoid shape, and it may have been kept to its original foundation to the last. You will also recollect that in the early part of Mohammed's life it was hypæthral, the roof being formed by the cloth curtains that shrouded it, and that it was roofed with wood when he was thirty-five. I fancy the walls must have been pretty thick.

If we take 3 ft. for the walls, we get joists 17 ft. long, and the longitudinal girders could only have had a bearing of about 6 ft. 3 in. from centre to centre if there were six columns.

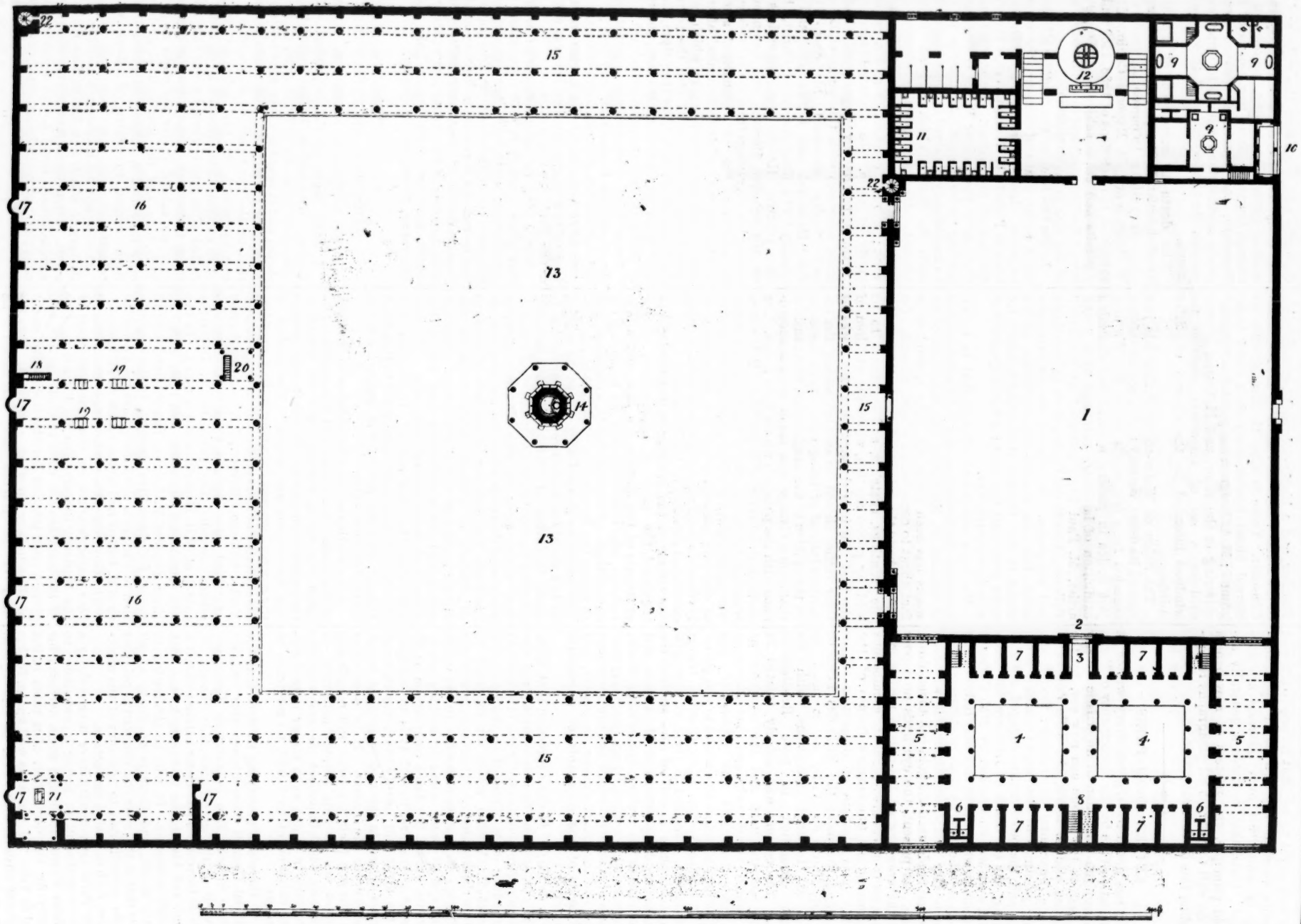
One is apt to think ancient ships, with the timbers of which the Kaaba was roofed, were small. I am by no means sure that the large merchantmen were not of considerable tonnage; at any rate, the ancients could and did build very large ships. The pontoon that carried an obelisk from Egypt to Rome, was big enough to form the caisson for the foundation of one side of the dock at Ostia, that the Emperor Claudius had built; and Ptolemy Philopater (222 B C) built a vessel 420 ft. long, 57 ft. wide, and 72 ft. from the water to the gunwale. This, it is true, was not so great as our *Great Eastern*, but it showed that the ancients could build vessels that were not in the category of fishing-smacks, so we may suppose the timbers of Bacûm's vessel were big enough to roof the Kaaba.

If there was any ornamental art displayed in the interior, it must have been in carving on

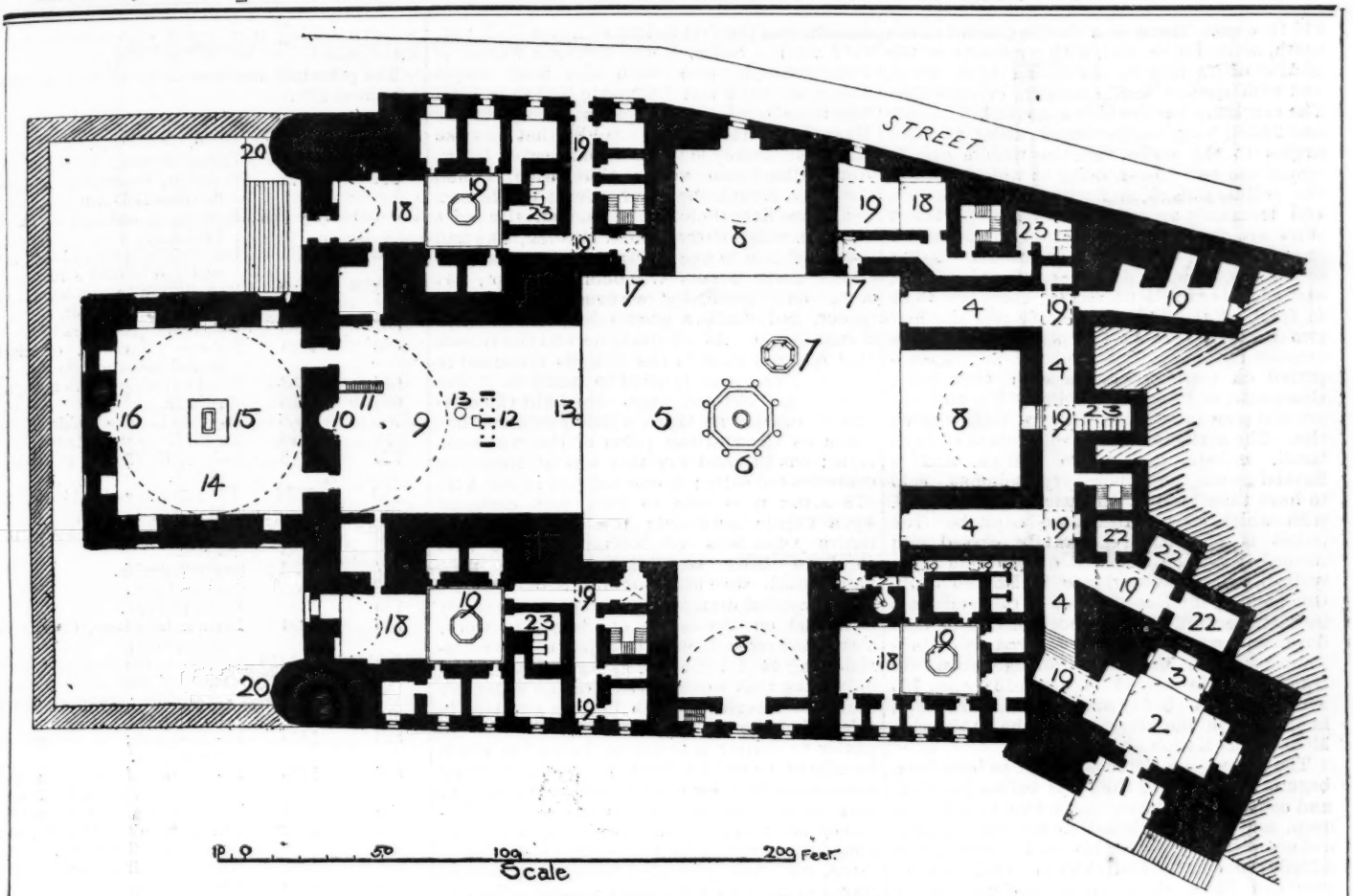
* Being the second Royal Academy Lecture on Architecture this session. Delivered on Thursday evening, January 28.

References.

1. First Court.
2. Okel, or building for reception of travellers.
3. Porch.
4. Courts with Porticos.
5. Stables.
6. Latrines.
7. Chambers.
8. Stairs to First Floor.
9. Public Baths.
10. Tank.
11. Latrines.
12. Sakyeh, for raising water from well.
13. Grand Court of the Mosque.
14. Fountain and Basin for ablutions.
15. Galleries.
16. Sanctuary.
17. Niches for prayers.
18. Chaire.
19. Pulpits where Koran is placed.
20. Tribune from which the Muezzin announces the hour of prayer.
21. Tomb.
22. Stairs to Minarets.



Mosque of Amru, Cairo.



Mosque of Sultan Hasan, Cairo. (*See page* 99.)

the beams, or in the capitals of the columns; but Bacûm, the architect, was either a Greek or a Byzantine, so this art, if it existed, cannot be put down to the credit of the Saracens, and as little can the wall-paintings of Abraham and the Angels be attributed to them; these were the pictures Mohammed had erased when the idols were destroyed.

The Kaaba had a golden spout, and its doors are said to have been plated with gold; it was covered with cloth outside. It is no use speaking now of the black silk damask with which it was covered by the Abbassides, with a gold band, and a Cufic inscription.

The next religious building we know of was Mohammed's Mosque at Medina; this, no doubt was greatly bigger than the Kaaba, as Mohammed's followers had become numerous. It is by no means certain that at the pilgrimages many were admitted into the Kaaba; at any rate, Mohammed most distinctly stated that entering the Kaaba was not necessary for the due performance of them, and regretted that he had gone into it at the taking of Mecca (8 A.H.—630 A.D.).

This mosque at Medina was probably like the Kaaba internally, only with many rows of wood pillars, probably with the girders parallel to the long side; there appear to have been buildings or porticoes for shelter on both sides of the court,—viz., one for men and one for women,—but this court seems to have been divided from the Mosque by a street. We also know that its kibla was changed from Jerusalem to Mecca,—*i.e.*, from north to south, so the Mosque was possibly walled in; it had no mehrab, or niche, for that was only adopted in 53 A.H., and was probably copied from the apse of a Christian church, but this mosque was rebuilt, and the houses of Mohammed's wives destroyed and taken into it by Welid I., between (86 and 96 A.H.) 705 and 715 A.D.

The next mosque we know of was that of Omar, at Jerusalem. Omar visited Jerusalem in 15 A.H., and it was built after he left. Some believe it was the dome of the rock.

Fergusson gives a small building about 90ft. by 30 ft. over all, in the mosque of El Aksah, as Omar's mosque, which he says is 80 ft. by 18 ft. inside, but the latest authorities believe it was a small wooden mosque since destroyed.

The next considerable one was built at Old Cairo by Amru-Ibn-al-Aás, the conqueror of Egypt, in 20 or 21 A.H., some ten years after Mohammed's death; it was built for the use of the army, and was only about 75 ft. by 45 ft., and without a mehrab. It was enlarged by Moawia, and again by Abd-al-Aziz, the son of Merwan I., then governor of Egypt, who raised the roof.

In the days of Mamun (193-198 A.H.) the mosque was 435 ft. by 225 ft.; in 275 A.H. the mosque was burnt, and the green table destroyed, and was restored by Ahmed-Ibn-Tulun's son, who expended about 4,080*l.* on it, and the architect's name was El-Adjifi; a new portico was added 357 A.H., and it was restored by Saladin between 567-589 A.H. = 1172-1193 A.D., and afterwards repaired by Beybars and Kalaun 658-689 A.H. It can only be hoped that from its being the first mosque built in Egypt, so soon after the prophet's death, that the peculiar sanctity, which in the eyes of devout believers still adheres to it, occasioned the restoration to be as much as possible on the original lines. All that can be safely said is that it conforms in plan to the early mosques.

The town of Kairouan was founded by Ocba, three days' journey to the south of Tunis, in 50 or 55 A.H., and the mosque was probably built shortly afterwards. Welid I.'s mosque at Damascus was probably built about 86 A.H., and the mosque and Cordova 170 A.H. = 786 A.D. The year of our era may always be got approximately by adding 622 to the year of the Hegira, but it is not exact as the Moslem year is lunar.

The original idea of a mosque for Islâm was a wall at right angles to the meridian or kibla of some holy place; first, the Temple of Jerusalem, and then of the Kaaba at Mecca, with a shelter to shade the worshippers from the sun. As the prophet got old he introduced a pulpit, with three steps and a seat, so as to be heard better, and to rest when he was tired. Subsequently the exact line of the kibla was defined by the niche or mehrab, and the pulpit (mimbar) became a fixture, mostly on the right side of the niche, as you face it. Nearly in face of this was the tribune (dikka), from which the Korân is recited, and the prayers intoned by the imam. A courtyard, with a tank or fountain, was wanted for the legal purifications before praying.

It is most embarrassing to know which of the early mosques should be chosen as the type, as they were all altered. I have spoken of the Kaaba, Mohammed's mosque, and the Mosque of Omar; the mosque at Kairouan, founded in 50 or 55 A.H., is said to have been wholly rebuilt by Hassan in 84 A.H., except the mehrab, and altered subsequently up to the date of Mamun A.H. 212, so probably that at Damascus will be the best to begin with. It is about 460 ft. by 316 ft., with a small projection to the right and left, looking at the niche; the sanctuary itself is about 130 ft. deep by 460 ft. long, the rest being a courtyard, with a single portico or cloister round three sides of it; the wall with the niches is nearly due south; the sanctuary itself consists of three aisles, with the arcades parallel to the niche, or south wall, an unusual arrangement in later mosques; there are twenty-three arches, the centre one, opposite the niche, is as wide as three ordinary arcades; in the middle aisle, in front of the niche, is a dome supported on four massive piers. The sanctuary is described by an eye-witness as having pointed arches, resting on marble columns, and over them clearstory windows, the north ones are traceried and filled with beautiful stained-glass; the lower part of the walls are lined with marble, and remains of mosaic are found in the upper part of the central space fronting the niche.

The Mosque of Amru, at Old Cairo, is about 361 ft. wide by 548 ft. long, but this includes an outer court, with a khan on one side and baths on the other; the mosque proper, with its court, is about 384 ft. long by 361 ft. wide, and the sanctuary 361 ft. long by 111 ft. deep. The mosque has one single cloister to the entrance wall and a cloister on each side: looking to the niche, the right-hand cloister has three aisles, and that to the left four,—in both cases the aisles next the walls are very narrow. The mosque itself has six arches in depth, with the arcading at right angles to the niche wall, and twenty-two aisles in all,—those next the end walls are narrow, being continuations of the cloisters. The arcades have slightly-pointed horseshoe arches, supported on Classical or Byzantine columns of marble, with carved capitals; a pier of three courses rises from the cap, and then there is a slight projection formed by the heels of the horseshoe arches. The voussoirs are of two differently coloured stones alternating, or the alternate ones are painted red; the columns are tied both ways with wooden ties, after the fashion of Byzantine work. In 1866 this mosque was the Government "refuge for the destitute," and young ragamuffins were playing at buttons with the carved ivory panels they had knocked out of the pulpit.

The next is that of Kairouan, called El-Kebir. This mosque is not rectangular, nor are its sides parallel; it is about 407 ft. deep by

245 ft. wide. There is a double cloister at the north, or entrance, end, with a minaret in the middle of its length, embracing both aisles, and with similar double cloisters on each side. The sanctuary itself, which is about 156 ft. deep and 242 ft. long, has seventeen aisles at right angles to the niche wall, the middle one, in which are two domes, being as wide as two of the ordinary aisles, and with double columns, and is mainly arched the same way, though there are three lines of arcading parallel with the niche wall, which carry the domes. It has ten arches, with a wide one next the niche wall, carried on coupled columns. There is a dome in front of the Mehrab, and one over the first two arcades, both in the centre aisle. The arcades have slightly horseshoed arches, supported on marble columns with Corinthian, Composite, or Byzantine capitals. The columns are tied above the caps both ways with wooden ties. The niche is covered with inlays of lapis lazuli, mosaic, and white marble, and is flanked with two porphyry columns, said to have then been worth their weight in gold, with white marble Byzantine capitals. The pulpit is of wood, elaborately carved, and pierced, with the divisions of the balustrade vertical,—a rare occurrence in Moslem work. One point of interest attached to this mosque is its having served as the model for that of Cordova, and was doubtless endeared to Abd-al-Rahman when he was skulking about in Numidia. He landed in Spain 138 A.H., 755 A.D., and was shortly after proclaimed Kaliph in Spain, in the days when the Abbasside Mansur was Kaliph at Baghdad.

The mosque at Cordova is said to have been begun in 786 A.D., the year before he died, and consisted of eleven aisles, twenty-one bays deep, and was continued by his son Hisham, and completed by him or his son El-Hakim, who added the court. El-Hakim II. (961-70 A.D.) extended these eleven aisles southwards by twelve bays, and built the niche and some chambers. El-Mansour (981-1000 A.D.) is believed to have added the eight aisles to the east, thirty-five bays deep, and probably the remainder of the court.

The total enclosure of the mosque is 580 ft. by 435 ft., and the sanctuary 435 ft. by 390 ft.; there must have been at least 650 arcade columns, besides others for enclosures. The court-yards had cloisters round three sides, and were planted with orange-trees, in continuation of the columns of the open aisles.

The arcades of the mosque are at right angles to the niche wall, and consist of horseshoe arches on the capitals of antique marble columns; above these are semi-circular arches carrying the walls, which support the trusses and gutters of the roof. The voussoirs of the arches are alternately stone and cut red bricks. There was an enclosure in front of the Mehrab (the Maksura), and an enclosure or pew for the Kaliph in front of that, now called La Villa Viciosa.

The arches forming the Maksura are cusped, and each span is equal to the space between three columns, as arches below spring from each side of each column they intersect.

On corbelled projections, on each deep abacus, stand small shafts bearing horseshoe arches above the upper interpenetrating cusped arches.

In the Emir's pew, the lower cusped arches are not intersected, but have a cornice carried on colonettes; from the colonettes horseshoe arches are turned, and from the centre of each cusped arch below there is an upper cusped arch, which cuts the horseshoe arches, and fills up the spandrel. In my opinion, the architecture is more curious than beautiful.

An illustration is given of the arcading of the Villa Viciosa, and some of the ornament of the arch of the Mehrab.

Even now, with a great Christian church dropped into the middle of it, the effect of this forest of columns is wonderful, the diagonal vistas being unique. These congregational mosques of Egypt, Syria, Tunisia, and Spain are grouped together, because they seem to show the early idea of a congregational mosque; for, though some of them are not early, the early idea seems to have been kept up. The mosque at Cordova was co-eval with the first break-up of the Kaliphate, and though the next, the Mosque of Ahmed-Ibn-Tulun was not the end, still it was one more step towards the general breaking up, when each country had an independent ruler,—Sultan, if not a Kaliph,—of its own. The independent rulers and Sultans sometimes owned the spiritual supremacy of the one a Baghdad, and sometimes did not. Saladin was the first Sultan of Egypt (567 A.H., 1172 A.D.). Selim I. the Ottoman Sultan of Constantinople took with him from Egypt Mutawakkil the last Abbasside Kaliph in 1517, who transferred the Kaliphate to Solyman the Magnificent, about 1520 A.D, so that now the Sultan of Turkey is the spiritual head of Islâm. Ahmed-Ibn-Tulun was a Turk from beyond the Oxus, brought up in the Court of Mamun, and in the School of Samira, and was the cause of the murder of the Kaliph Mustain, who had promoted him to a post of honour. He was afterwards made Deputy Governor of Egypt, 254 A.H., and gradually assumed independent power, and made a good ruler; he died 270 A.H., 883 A.D. As all the tithe and the tribute that formerly went to the Kaliphs remained in Egypt, Tulun was enabled to spend it in improvements and buildings. He built the celebrated mosque at Cairo, which Fergusson has taken as the starting point of the Saracenic style; but I should say this was at least two centuries too early; it was finished in 265 A.H., 878 A.D.; it is said to have been designed by a Coptic architect; the Copts are the native Christians of Egypt, and are said to have been very skilful in the arts, and, until we know more about Coptic and Byzantine ornament, nothing can be safely advanced on the origin of Saracenic work. Tulun had sense enough to object to any material being used but brick, as he said it was the only thing that would resist fire and water, his architect disagreeing with him, he put him in prison, but the architect managed to bribe his gaoler to deliver a letter to Tulun,* in which he offered to build a brick mosque, and, being summoned, he drew out his design on a skin of parchment; this was approved; he was furnished with money and materials, and completed the mosque in two,—some say three,—years, and was presented with ten thousand pieces of gold by Tulun, and a pension for life. The dome in front of the niche, and the wooden stalactites beneath it, are supposed to be of the time of the Sultan Lagin (696 A.H., 1296, A.D.), who repaired the mosque and put up the pulpit, now at the South Kensington Museum: whether he put up the dome over the fountain in the court is not known, but it is said to be at least a century later than Tulun, and may be looked on as one of the first domes we know that was carried on stalactites. The mosque is surrounded by a wall and a space on three sides to keep it quiet; in the space between the outer and inner walls of the mosque, opposite the niche, there is the minaret, with a corkscrew staircase outside, and the water-wheel, and,—as I read it,—the rest of the space was devoted to students, who studied theology. The outer walls are about 513 ft. square over all, inside are the walls of the mosque and its court, about 390 ft. wide by 450 ft. deep. The sanctuary is 301 ft. long by 109 ft. deep. A double cloister runs round three sides of the court, and the sanctuary itself has five aisles parallel with the niche wall, and an arcade of 13 arches; the piers are wholly formed of plastered brick, with engaged brick columns at each angle, with ornamented capitals and no bases: the piers are about 8 ft. wide, the arches form 17 bays at right angles to the niche wall, two at each end, being railed off. The arches are pointed and slightly horseshoed; over the abacus is a guilloche, which runs round the inner edge of the arch and along the bottom of the impost, and the archivolt and impost are enriched with a wide plaster ornament, both of the same pattern; this ornament consists of the "raie de cœur" on a gigantic scale, each leaf is filled in with ornament, after the manner of late Roman work. I have never observed that this has been noticed,—and some of the soffits are ornamentally plastered, with a large square guilloche, the large squares and angles are filled with ornament, and the small squares with rosettes.

On the external wall, in each arcade, are arched recesses with an ornamental archivolt and impost on engaged brick columns, the shafts of which are about the height of capitals; inside the first arch is another, with a Cufic inscription round it, and the windows are filled with pierced stone lattices that much resemble the geometric patterns of the fifth century, shown in De Vogües Central Syria, not copies, but even more ingenious. In the spandrel of each pier, a little above the impost, is a narrow opening with a stilted arch. The plaster ornament is very like Indian work. Below the wooden ceiling is a board with a carved Cufic inscription.

The principal mosques that still exist at Cairo are those of* :—

A. H.	A. D.	
20	640	Amru.
265	878	Tūlūn.
361	971	El-Azhar, repeatedly restored down to 1753 A.D.
380–403	990–1012	El-Hākim, restored down to 1423 A.D.
608	1211	Esh-Shāfi'y, a mausoleum, also restored to 1516 A.D.
647	1249	Es-Salih, a mausoleum, restored by En Nasir.
667	1268	Edh-Dhāhir (Beybars I.).
683	1284	Kalaun (Maristan, or mad house), minaret rebuilt.
687	1288	Kalaun (Kubba, tomb mosque).
698	1298	En-Nasir.
706	1306	Beybars II., Gashenkir.
718	1318	En Nāsir, in the Citadel.
723	1323	Sengar, El-Gāwaly, and Salār, joined.
739	1338	El-Māridāny (architect, El-Mu'allim Es-Suyūfy).
748	1347	Aksunkur, restored 1652 A.D.
756	1355	Sheykhū.
757	1356	Suyurghatmish.
760	1358	Sultan Hasan.
770	1368	Umm-Sha'ban.
786	1384	Barkuk (architect, Cherkis el-Haranbuly).
808–813	1405–1410	Barkūk, in the Karāfa, built by 'Abd-el'-Aziz and Farag, sons of Barkūk: architect, Lagin Tarabay(?).
823	1420	El-Muayyad; in process of restoration.
827	1423	El-Ashraf Bars Bey; also mausoleum in the Karāfa.
860	1456	El-Ashraf Inal, in the Karafa.
877	1472	Kāït Bey, in the Karāfa; also mosque within Cairo.
886	1481	Kigmās, Amir Akhor.
905	1499	Ezbek.
909	1503	El-Ghory (two); restored 1883.

El-Azhar, the brilliant mosque, founded in 361 A.H., 971 A.D., is a congregational mosque (Djami), with oratories, and is used as a university for the study of theology and jurisprudence by students from all parts of the Mohammedan world. The mosque is, roughly, an oblong, 280 ft. deep by 295 ft. long; outside this are three mosques, a court, and some chambers, and a fountain. The sanctuary is 282 ft. long by 126 ft. deep, and has in addition an open portico beyond it. One noticeable peculiarity is that the gate of Upper Egypt, which goes into the sanctuary, is composed of two doorways that have all the appearance of Early Gothic doorways, with trefoil cusps under the semi-circular arches that stand on the capitals of three slender shafts, undoubtedly done by some European architect of the Gothic school.

As regards the plan, it has a single cloister on the four sides of the court; on the right and left are aisles of three bays, with two columns on either side of the central aisle, all used for class-rooms. The sanctuary itself has nineteen bays at right angles to the niche wall, and at its deepest is nine aisles deep, the arcades being parallel to the niche wall. The centre bay opposite the main niche has three columns on each side, which support a high pavilion.

It is useless to speak of its decoration which may date from the middle of the eighteenth-century. If it was not burnt down, the 380 marble columns it is said to contain, are probably Classic and Byzantine, plundered from the temples and churches of Upper Egypt. The Mosque of Beybars I., called Edh-Dhahir (667 A.H., 1268 A.D.) looks like a congregational mosque. It is 351 ft. deep by 345 ft. wide, with flat projecting towers at the angles, and projecting gateways on three sides. The sanctuary is 345 ft. long by 125 ft. deep. The court is surrounded by an arcade on piers, these enclose two aisles each, in the middle the supports are columns. The sanctuary is divided longitudinally in the centre by a line of arcades, parallel to the niche wall, supported on small piers. There are six aisles in depth, with the arcades of the rest supported on columns, the three centre bays next the niche are formed by arcades on piers, the square so formed in front of the niche is covered by a dome, about 39 ft. in diameter, whose angles are supported by stalactites. There are nineteen bays in the sanctuary.

The oratories or mosques of Kalaun are attached to a mad-house (Maristan), and to the

* This ruler's name was Ahmed, the son of Tulun, but the mosque is best known by the father's name.

* Extracted from "The Art of the Saracens in Egypt." By S. Lane-Poole. 8vo. London; 1886.

right of the entrance is the tomb oratory or mosque (Kubba) 683-7 A.H., 1284-8 A.D.

As land got more scarce in Cairo, the old form of mosque, with its forest of columns, was given up, and a form much like the domed palaces of Persia was adopted. The mosque of Sultan Hasan is a brilliant example of this sort of mosque without piers or columns; it was built in 760 A.H., 1358 A.D. It is built on an irregular-shaped piece of ground, and though his tomb and the minarets face an open space, the main entrance is in a narrow street. At the end of the vestibule here, Sultan Hasan used to sit to administer justice. Some narrow tortuous passages from this entrance lead into an open oblong court about 115 ft. by 104 ft., with a fountain in the middle, shaded by an open octagon shelter, with a dome over it,—the dome has a band round it with the signs of the Zodiac; on each of the four sides are the arms of a Latin cross,—three are about 46 ft. wide, and the same depth, and one, forming the sanctuary of the mosque, 67 ft. wide, and 89 ft. deep, behind which is the domed tomb, also 67 ft. square. Each arm of the cross is vaulted, with a pointed vault, having an arch on each face about 92 ft. high to the crown from the pavement of the court; nothing grander can be conceived, as each of the archways open on to the court without any screen. The vault, besides the soffit of the arch, has four flush ribs with red and white voussoirs. At the niche end the sanctuary is panelled with marble up to the frieze from which the vault springs; at the end there are two doors into the tomb and the pulpit; above these doorways are two-light pointed windows, with a bull's-eye over the centre. The frieze which runs round it is ornamented with a Cufic inscription on a floral ground, with a cresting above, the whole carved in low relief. The frieze is of the exact proportion required, and is in such flat relief that the ornament in no wise interferes with the general effect; the sublimity of this vast plain vault suggests Greek art.

There is a charming little mosque and tomb of Kait Bey 877 A.H., 1472 A.D., this is also without columns, and instead of an open court has a covered one, with a latticed lantern.

In the earlier mosques, the exterior has no architectural display, as they are mostly merely walls with battlements pierced in fantastic shapes, or with the regular stepped battlements called "bearded," and it is not until domes and minarets make their appearance that there are any very striking external features.

I omit the mosque of El-Azhar, as the date is quite uncertain.

It seems most probable that the wooden stalactites in the dome in front of the niche at the Mosque of Tulun were put up by Lagin 696-8 A.H., 1296-9 A.D, and that, therefore, at that time they were fashionable, though unknown in the time of Tulun 270 A.H., 883 A.D.; we may be pretty sure there was not much building in Egypt and Syria between 1099 and 1249 A.D., considering the Crusades and the disputes between the Fatemite Caliphs, the Kurd Dynasty, and the Turks or Mamluk Sultans.

One of the most striking peculiarities of the religious architecture of Cairo is this, that many of the mosques were built with courses of red and white stone, or occasionally with white and black, or they were coloured to imitate them. The black and white courses, though not so common as the red and white, are in this respect like the Cathedral at Genoa and the churches at Florence and elsewhere in Italy. The external appearance of a mosque is that of a two-storied building, the lower windows being mostly square-headed; the lintels and the arches over them mostly had the junctions of the voussoirs of the most fantastic outline, and of two differently-coloured stones or marbles; if these outlines were worked through the stones it implied incredible labour and superhuman accuracy. The upper windows are mostly plain pointed, or doublets with a bull's-eye over the centre spandrel, surrounded by a trefoiled frame. Here and there wide flat piers were brought out with stalactites between them at the top to make the cornice and battlement in one line. Sometimes there was a cornice above, consisting of tiers of stalactites, and sometimes no cornice beyond a moulding, but as a rule battlements crowned the whole. A most original feature occurs in many of the later mosques; a flat recess was made where a door occurs, which was carried up the whole height of the two stories, and finished at the top with a trefoiled arch, mostly filled in with stalactites, while between the head of the door and the bottom of the stalactites are windows or ornamental panels. As far as we can now see, there was no general system, but each architect had genius enough to make a picturesque whole, in spite of the openings being arranged only for the plan. The architects as often as not drew away attention from the want of symmetry in the main building by curious and elaborate ornament and the sharp shadows of the stalactites, while minarets and domes broke up the outline. The front of the tomb of Sultan Hasan is symmetrical, the centre is crowned by the dome, and the whole front is flanked by two minarets. The domes mostly have a drum, and this is generally pierced; only the domes that are plain externally are usually four-centred; the later ones are three-centred, and are covered with flutes, reeds, or chevrons; while some have elaborate geometrical ornaments carved on them, and some have counterchanging ornamental patterns; some are covered with an elaborate floral ornament, and then diapered over. Domes are usually constructed over square chambers, especially if they are sepulchral. The domes have no pendentives, but are supported by corbelling at the angles, the corbelling being cut into stalactites. The edges of these mark out the external truncated gables. The angles of the square base of the dome were mostly chamfered off, and ornamented with triangular stops, or deeply moulded, while the truncated gable is most commonly filled with a triplet window, with three circles or bull's-eyes over it, enclosed in a cinquefoil border; the centre part of the gable is sometimes formed into a square, with two triangles on each side; these are commonly filled with circular ornamental panels. The pointed tops of the domes are mostly finished with a finial of bronze crowned by a crescent.

It was a favourite plan to make the bottom of the tall minarets solid up to the roof of the mosque, but it is by no means always the case; it is the case, however, at the mosque of Sultan Hasan, where the large minaret, to the top of the masonry finial, is about 330 ft. high; a great many of the smaller minarets are from 150 to 160 ft. high from the ground; they form the most striking architectural feature in Saracen mosques, and are often most elegant in shape and proportion. Sometimes they spring from above the cresting or battlements of the mosque, and sometimes their bases form projections from the main wall. As they are used instead of belfries, the cryer calling the hour of prayer five times a day from them, they are mostly formed in stages, the balconies or the stages being carried by a deep stalactite cornice, the balustrades being of pierced stonework, or more commonly of wooden rails. The minarets are mostly crowned by a stone pear-shaped finial like an Indian cup and ball; the finials frequently look as if pierced with arrows, these are, however, slight wooden gallows, for holding lamps. The minaret of Sultan Hasan's mosque being the highest, a slight description of it may be given. Its solid base is polygonal, and gathers into a circle beneath the deep stalactite cornice of the mosque, which once had a flower-de-luce battlements; the minaret above the cornice is about 26 ft. square, and runs up vertical to a height of little more than its width, in alternate courses of red and white, it is then chamfered off into an octagon, just above that the stage is marked by a stalactite balcony, on each of the four square faces, the chamfered ones are ornamented in the flat with a square set anglewise in a square frame in each of the eight faces above it one long window-shaped recess with red and white courses, the stilted arch stands on slender engaged colonettes, the circular heads have half-domes in them, a deep stalactite cornice forms the next stage, with a pierced stone balustrade, and a slightly smaller octagon goes up to the next story, and here the stalactites are grouped at the angles, this also has a pierced stone balustrade, above is a circular open lantern with cusped arches on columns, this has a stalactite cornice and a stone balustrade, out of this springs the cup and ball in masonry, and above this there is a finial with a crescent, and round the pear-shaped finial are a cluster of little gallows, for supporting the lamps; in its ruined state the first stage is not marked enough by the corbelled balconies. That of the mosque of Kait Bey is one of the most elegant, but like that of Sultan Hasan, since the battlements have gone, is a trifle thin at the base above the mosque. The treatment is very similar to that of Sultan Hasan's, but better proportioned, and the third division is circular, and covered with a geometrical pattern, with a central star on each face. Most of the mosques are roofed internally with wood, with the exception of those of Sultan Hasan and Barkuk. The latter has piers instead of columns, and the aisles of the sanctuary are domed with domes, whose pendentives are of the same radius as the flat domes, and not marked by a different curvature. Some of the wooden-ceiled mosques are panelled, but the most striking ones are those with circular timbers, bracketted into a square next the walls, the junction between the square and the circle being effected by means of stalactites. When the whole of the beams and the ceilings are painted and gilt the effect is very gorgeous, and unlike anything else one has seen elsewhere, for almost all the Venetian ceilings so treated have rectangular beams. The lattice work, inlaid wood and marble work, chased and damascened brass work, some of the mosaic where mother-o'-pearl is used for white, and the stained-glass windows, are models of elaborate and excellent work, and the stained-glass windows are lovely. What the effect must have been in the palmy days, when everything was in perfection, and all the accessories were to match, we can scarcely picture to ourselves. The descriptions in the "Arabian Nights" of all this work, which in our youth we fancied were wholly imaginative, are merely descriptions of what met the writer's eyes every day. The "Arabian Nights" are believed to have been put into the form in which we read them, just after the Ottoman conquest of Egypt, and represent the palmy days of Saracen art, at the time of the later Mamluk Sultans, though the stories and adventures are said to have occurred in the days of Harun al Rashid or earlier.

FASHIONS IN ARCHITECTURE AND ITS KINDRED ARTS:

THE ARCHITECTURAL ASSOCIATION.

THE ordinary fortnightly meeting of this Association was held on Friday, the 29th ult., Mr. F. T. Baggallay, President, in the chair.

The following gentlemen were elected members of the Association:—Messrs. C. H. Thewlis, W. Hearn, G. B. Gosling, F. G. Hunt, R. V. Hunt, and W. J. Langley.

Mr. F. T. W. Goldsmith, Honorary Secretary, announced that Mr. Arthur Bolton had presented to the Library his book on "Examples of Mosaic Paving," and that the Editor of the *Builder* had presented "The *Builder* Album of Royal Academy Architecture, 1891." Thanks were voted to the donors.

Mr. Goldsmith also announced that a visit would be made on February 6 to Mr. Aston Webb's new assurance building* in Moorgate-street, and also to the tower and spire of Bow Church, by kind permission of Mr. Innes. And on February 20 a visit would be made to the Imperial Institute, by permission of the architect, Mr. T. E. Collcutt.

The President said that he regretted to say that Mr. N. J. W. Westlake, who was to read the paper of the evening on "Fashions in Architecture and its Kindred Arts," was unable to be present, but Mr. Goldsmith had very kindly consented to read the paper for him.

Mr. Westlake's paper was as follows:—

I have selected as the subject of my paper "Fashions in Architecture and its Kindred Arts," and, for the purpose of illustrating this, have made a short *résumé* of some of the various changes that have taken place during the present century.

It will be at once evident that any observations on the ancient and recognised styles can only, in this slight essay, be dealt with in a summary way.

In commencing, it is my intention to epitomise some of the differences of style that fashion, from time to time, has adopted during the present century. I shall then put certain propositions before you as the cause or causes of the rapidity of these changes in recent years, and conclude by attempting to show how all this may be worked to a good purpose.

We are all of us continually told by those who claim to be men of "light and leading"

* Illustrated in the *Builder* for May 17, 1890.

what is *the* thing, especially in the way of style. Notwithstanding this, we have seen sometimes the same leader change, from a dogmatic adherence in preaching the imitation of some ancient style,—because of some supposed or real subjective value that its characteristics enshrine,—and, altering his opinion, use the same arguments in favour of another, and, finally, perhaps boldly relinquishing his line of argument, opinions and all, in favour of this, advocate something entirely different. The cause of this is difficult to explain. Often it is because some architect or artist having made a success and a reputation in another style to that formerly in vogue, has attracted many followers, thus forcing a change of fashion, and your man of "light and leading" is fashionable in his opinions, or nothing.

We can all of us, however, if we will, observe motives and note their spring, and giving them as much value as we think they deserve, arrive at our own conclusions and practices accordingly, not placing any value on the mere customs or tastes of a day. We are, however, forced to ask ourselves this question: Why, during the last century the changes in architecture and the kindred arts have become rather those of fashion than of style, and why we now have no distinctive style proper to this great period—no style which embodies a real religious or national character, and why for a certain short period we design in any adaptation of either of the old styles and then discard it for another?

For me to attempt to answer this, here, would be going a little too much in advance of my introduction, and I must first give you, as far as I can recollect the succession in which some styles have been fashionable, for where a style is fashionable, the less informed in learned circles will see no merit in building or design out of it.

We may ask ourselves, could any method of enshrining a beautiful idea in architecture or art be more inviting than that of the Adelphi Adams, and the period of Reynolds, of Flaxman, of the Wedgewoods, and all the eminent men of that time whom I have no space to catalogue. Can you on looking back see any reason why such a fashion ceased, and that shown in the Houses of Parliament for a time arise, and Pugin,* Sir C. Barry, and kindred artists be in vogue? We all know Pugin's arguments in favour of the Gothic revival, and if my memory rightly serves me, one of the most celebrated art thinkers and writers that ever arose, whilst in some respects following the same line of thought as Mr. Pugin, said hard things about him and the "houses." Of course, you know I allude to Mr. Ruskin, who has been a power in the influence that at one time changed the mode of thought and fashion in art. The action of the Royal Academy during the century has been rather that of a body with an unsettled purpose. In its early days composition, design, and the more intellectual branches of the art were represented. Amongst its roll of members we often find the names of eminent composer-artists such as Flaxman, Maclise, and Dyce. The main object of the majority seems to have been simply to encourage mechanical and technical excellence until quite recently, under the present President, who with some few others has encouraged the study of the architectonic arts. The Academy has not, however (notwithstanding the recent advances in the architectural school), as yet during the present century shown us even the elements of a school of national artist-composers, great as some of its individuals are in separate branches of art. About half a century ago there arose the school of design at South Kensington, but I cannot think the influence of that expensive machine has been other than dangerous at times.† It has given us cheap drawing schools, but is national design, as national design, developed at all in proportion to the influence of the great and expensive machinery? My own impression is that nearly all modern developments and improvements are from minds that were outside its influence. I cannot, therefore, consider it a large factor in the changes that have taken place.

Many of us can recollect the influence that the Lille competition and the publication of Viollet le Duc's dictionary had for a period on our fashions. The Early French style adopted by Burges and Clutton,—the successful competitors for Lille Cathedral,—began to dominate, and I think you can find that adaptations of this style became so prevalent that nearly every architect practised it more or less.

We all know of work in that style by Clutton, by Burges (who never entirely deserted it), by Street, and by a host of followers, with a result that, personally, I sometimes think, was lamentable; for the host of followers seem to have delighted in the eccentricities, rather than the merits, of the style, and many of the arts were involved in its study and practice for a considerable period.

Later on, the competition for the Law Courts perhaps did much to produce a change in this, and we saw many of the competitors working from English models, although the successful architect never completely escaped from his French "convictions."

The youngest of us have seen through the change, from Decorated to Perpendicular, the devotion to the so-called Jacobean and Queen Anne, and our present rising fancy, if there is one dominant, for a mixed Renaissance of a very indefinite character.

It would be superfluous before the present audience to go into greater details, you all know the names of the leading men of this century, and their changes of style, and many of you can perhaps give a reason for these changes as well as the architect or artist himself.

This brings me to the second part of my subject. Why have these changes taken place? Why, if one of the antique styles did for centuries, and one of the Mediæval styles for one hundred years, and was consequent and consonant to its predecessor, must we have now twenty or thirty different, and often incongruous, styles adopted in the same period?

What is the cause, not the accidental,—but the essential,—cause of this? Is it that there is no dominant national or religious character to enshrine, no dominant thought requiring a dominant idiom, no great and leading poetical aspiration in us, no really important idea for us as a nation to represent? So that we have fallen from the regions of the ideal, and are become more professional men and few poets! For I take it that architecture and art in their perfection are but concrete renderings of the author's finer imaginings.

The language, the idiom in which he spoke in ancient days, embodied an idea of which he was a part,—it was almost a "chironomia,"—and we even now, when gazing at times on these ancient works, seem to feel the author's emotions, and to be inspired by the same sublime ideas.

We appreciate at evening the grand outlines of their buildings as they appear like dreams, their masses showing dimly against the setting sun, and in the daylight we dwell on the sweet intentions or bold determination of their details or mouldings. We read their language, but have little occasion to speak it as they spoke it, and too great a love of various knowledge to limit ourselves as they were limited,—to the perfect expression of a few ideas; we forget that in this limitation of action there is an increase of power.

My argument may thus be condensed,—the higher architecture is an art, and like the other arts is a language* for the expression of thought; in this it distinguishes itself entirely from the science of building; perhaps to many my definition would be more acceptable if I were to say that it is a language combining science and art. In ancient times it expressed the ideas of the period in the idiom of the period.

In these times what is its position, what expression of living national or local idea is there in the Houses of Parliament, the Law Courts, the Meat Market, in the various new Board schools or workhouses? You may answer, little; but tell me to look to the railways and their stations, the City warehouses and those real expressions of living national architecture, the ships, but for my own part in these last only do I find what I desiderate. If, then, there is neither dominant idea nor dominant idiom, what is the architect to do? and the most rational answer to this, in my own mind, is that he must either express his own ideas, embody his own fancies, or represent the ideas of some living energy to which his mind is affiliated.

When I said that we were now more professional men than poets, it was not my intention to imply that there are no poets left,—no architects whose works speak of their nobility of aspiration or intelligence. Far from it. There are some few. It would be invidious to choose examples amongst the living, but I may mention the names of two who have not long passed away, and with whom I was intimate; and so far as I had opportunities of forming an opinion, I think they had minds so full of sympathy and intelligence that they would have been marked men, no matter in what method they expressed themselves. I allude to Burges and Sedding, and I would take them as exponents of the two ideas I have mentioned,—Burges of the first, and Sedding of the second. Burges imbued his sensitive and poetical mind in Mediæval lore; he was almost at home in its ideas when an accident led him to study early French architecture, and he learnt to speak in an idiom of his own formed upon that basis. He cared not to speak much in any other way; if he did, he did it with that difficulty with which one speaks a foreign tongue, and you all know at sight Burges' works, and from them Burges' ideas; they are not, as far as I can appreciate anything, more than an individual expression, but they expressed the man, his intelligence, his great information, his power of adapting that information, and his poetical disposition.

Sedding affords us a complete contrast; intelligent, fairly learned, of a refined and poetical mind, he rather represented an idea than himself. He did not work long enough in any style to form for his own use a distinct idiom, although he managed by his ability and sympathy to express himself in many ways; his individuality was never so apparent in his work as was that of Burges.

This, then, I suppose is the highest point in which the architectural arts can now aspire as national arts. What might be done by the nation, or even by the City of London, or the various large parishes, is one thing,—what might be done had they unity and honesty of purpose is magnificent to think of; but what is done amounts, I fear, to little more than a series of jobs in which those capable of intrigue have had far greater chances of success than men of reflective, conscientious, and poetical dispositions.

Look at the majority of public buildings, the workhouses, and the Board-schools, and tell me do they represent in any way the best or the second-best architectural genius of their period. You, who can form a fair opinion, tell me,—am I right or wrong.

Returning, then, to my subject, I fear this change of fashion, then, is unavoidable, we shall not have a nineteenth-century style. The era will pass without any distinct architectural expression like the period of a nation, if such a society can be so-called, of mixed languages. But what are the advantages of this disadvantageous position, as we are soon to enter a new era,—the twentieth century? History never repeats itself, yet its life and ideas are the products of its predecessors. I will return to this point presently.

I daresay most of you will agree with me now in the statement that this is the first century in the history of the world's civilisation unmarked by any dominant architectural style.

If the history of a country is written in its monuments, what will the historians of future centuries say of this? Will they be right in saying that it was a century of "Fashion,' of vacillating thought and of changing or unsettled purpose, in which everything was tried and nothing stuck to? One cannot tell, but this we know, that if as a nation, as a people, we have made no great and distinct monumental mark, as individuals we may still have character and purpose.

Perhaps, then, as a necessity of the position in which we live, if we differ in our characters and purposes, the great knowledge of the various styles which have been diffused by the successive study of them will be of some use to us and to coming men, from which each mind can adopt that best suited to its bent. Wren and Inigo Jones did this as Burges and as Pugin did. Moreover, this knowledge of the character and the details of each style enables us by comparison to form a clear and intelligent knowledge of the capacities of each, as though we could speak many languages and choose that which best expresses our thoughts, even if we lacked a mother tongue. Of course, a mind allied to very firm convictions and of a strong character may out of this knowledge evolve a style which may embrace the thoughts

* Probably the Oxford movement assisted this, but was not the cause.—N. H. J. W.

† One instance alone shows a mischievous tendency, the establishment of a school of design at Bombay, which did something to injure the previous Indian tradition.—N. H. J. W.

* Of course, it is not a language, but like it, in being a method of expression.—N. H. J. W.

of an age, and become that of a coming era, but I think, as yet, we are looking for this mind. At any rate, when such an one arises there is a vast store of knowledge in the Art literature of this century, so collected and ordered that he will not require mental food. He will have this advantage over those who have preceded him, in any period, for never has there been so vast a store-house, nor so much accumulated store, so readily obtainable, and to this cyclopædic accumulated store of Art knowledge the Architectural Association has been no small contributor.

Mr. Owen Fleming, in proposing a vote of thanks to Mr. Westlake for his somewhat philosophic paper, and to Mr. Goldsmith for reading it, said that the paper was rather difficult to discuss; in fact, he did not think there were very many points in the paper which one could discuss in any detail. There was the large question as to whether the architects of the nineteenth century were inventing a new style; and as to that question he was getting tired of hearing the public talking so much about "a new style." In the *Standard* the other day there was a leading article commenting upon the election of Mr. Jackson to the honourable position of Associate of the Royal Academy. He was sure they were all glad that Mr. Jackson had obtained that position, which he ought to have obtained long ago. The *Standard* said that architects did not appeal very much to the general public unless they invented a new style. That statement seemed to him to show an entire misconception of architecture as a whole. Architects never had invented, and, he ventured to say, never would invent, a style. To talk of *inventing* a style of architecture was to show a complete ignorance of the subject. To his mind, a style was that which grew out of the natural necessities of building, and out of the position that a people held in the civilisation of the world. It was frequently urged against architects that this nineteenth century was an age of individualism and eclecticism. That was so, no doubt, to an extent; but he thought that we English of the present day were not competent judges whether we had a definite style or not. Four or five centuries hence the historian who wrote the history of the nineteenth century would be able to find out the prevailing characteristics of nineteenth-century architecture, just as we had discovered the characteristics of the architecture of the Greeks or Venetians, or of that of the thirteenth or seventeenth century. Each century had its own individual style, but he did not think that any of the persons who created that style were aware of what they were doing; they acted just as they felt prompted to act, without any consciousness of "inventing."

Mr. Paul Waterhouse, M.A., in seconding the vote of thanks, said the subject which had been touched upon in the paper and commented upon by the last speaker was a very deep one, and one which exercised the minds of architects a great deal; still more did it exercise the minds of those who, without being architects, took a great interest in architecture. Architects were perhaps, as a rule, too busy to theorise about their art. The remarks made by Mr. Fleming as to the possibility of a future historian recognising in the architecture of the present day chronological characteristics which we of the present time could not see, contained, he thought, the germ of a very great truth. All the original styles of the world had been the outcome of national characteristics and geographical conditions. As the original styles were exhausted, or, perhaps, not exhausted, but rather fulfilled, in their original form, the world had been obliged to modify them, and very little good architecture, perhaps, had been produced since the year 1400 (or, say, 1500), in which there had not been a more or less conscious imitation of the styles of the past. But if they were to consider, for instance, the stream of revival which first began in Italy about the year 1425, they would see that that stream flowed in certain countries in Europe, more or less continuously, down to the beginning of the present century, perhaps even longer. He supposed there had been no break in the string of those who had been following in the wake of the Renaissance movement, first started in Italy, and carried on in Italy, France, and other countries for four centuries. And yet an expert in architecture could, by studying the buildings of those countries during that period, pick out the half or quarter of a century to which a building belonged. He thought we made a great mistake in comparing the conditions of to-day with those of the past. Those who cried out for a new style asked whether the world was so played out that it could not bring a new style into existence? But the conditions had altered; and why? If they looked at the architecture of those countries where the means of communication were good, a similarity of architecture was to be seen. In England, for instance, there was a distinct architecture of districts, due to the fact of easy communication within those districts. As communication in the world increased, of course the natural result followed that similarity of architecture took place. That was due not merely to the fact that architects were necessarily plagiarists, but to the more important fact that association played so great a part in our satisfaction with architectural design. They could not get away from the feeling of association. There was something absolutely repugnant in the idea of novelty for novelty's sake in architecture, except in the matter of grouping and the modification of detail; and thus it was that when communication became more or less universal, architects were universally imbued with the associations of surrounding architecture, and leaned upon them; and their critics leaned upon them too.

Mr. C. H. Brodie said he would like to refer back to Mr. Westlake the question whether he, as an artist, would be satisfied with the effect produced by buildings which so entirely spoke their purpose as some of our railway-stations, for instance, and some of our ships?

Mr. Leonard Stokes said he was not quite sure that he gathered what Mr. Waterhouse intended to say; but if he meant that communication governed architecture, or, rather, if he meant that because it was easy to get from one place to another, therefore the architecture of all districts should be the same in character, he (the speaker) could not agree with him. If they happened to be in a stone district, and were, by means of a railway or a canal, able to bring bricks into the district from a brick district, he thought it would be wrong, from an architectural point of view, to import bricks into the stone district, and build a red-brick mansion, for instance, with terra-cotta dressings. He thought the proper thing to do was to build in stone, provided it was good stone, if they were in a stone district. No doubt Mr. Waterhouse agreed with him, and would not wish to see architecture too much alike all the world over. For his own part, he hoped that such a thing would never be brought about. He felt that one great charm of architecture was that it did adapt itself so admirably to local facts and difficulties: in flint districts they had flint churches, in brick districts brick churches, and in stone districts stone churches. The old architects made good use of their materials, whatever they were, and he thought it would be a great pity if the day arrived when, because one might happen to like terra-cotta, which he (the speaker) did not, that therefore it should be used everywhere, regardless of local circumstances and traditions.

Mr. Waterhouse said he respectfully disagreed with the deductions which Mr. Stokes had drawn from his remarks.

Mr. F. T. W. Goldsmith said he took it to be Mr. Brodie's wish that the question he had put should be conveyed to Mr. Westlake; but as he (the speaker) was in some sort Mr. Westlake's champion in his absence, he wished to say that he did not think that the question quite embodied the idea which Mr. Westlake meant to convey by his paper. He did not think Mr. Westlake meant that they were to design their buildings with an entire absence of decorative detail, but rather that they were to design them in such a way as to indicate clearly their different purposes and the period when they were built. Mr. Stokes had remarked that he would be sorry to see architecture alike all the world over, but the tendency was in that direction. Old customs and influences, which they clung to with affection owing to their associations, were gradually being swept away in the face of what was called modern civilisation. He did not think it was a thing to be regretted if they took it in the proper spirit,—in the spirit which animated the architects of the Renaissance,—for we found that during that period, in France and Italy particularly, many almost identical designs were carried out, executed, however, with different materials and with details differing according to the idiosyncrasies of the architect. He thought that it would be well for them if they were to attempt to carry out the ideas suggested by Mr. Westlake with singleness of purpose, and he must say that he had a great admiration for a building which was built "up to date." A modern city warehouse, for instance, in which economy of space and suitability of plan had been studied, and in which everything, such as matters of lighting, &c, had been carefully thought out, was capable of being made, in a degree, as good and true a piece of architecture as a Gothic cathedral or Renaissance palace. He did not wish to institute comparisons, but he thought that if modern problems were approached in the same consistent spirit that the old men would have approached them, whether in Gothic or Renaissance times, whether in the manner of Pugin or of Sedding, the result could not but be satisfactory. He thought Mr. Westlake was quite right in contending for absolute honesty of purpose in building, and that every new building should be erected, not in the spirit of the thirteenth or any other century, but in the spirit of 1892.

Mr. E. Woodthorpe, M.A., said he quite agreed with Mr. Waterhouse's remarks. In the present age of steam and railways, we were so easily brought into contact with other countries,—facilities for travel were so great,—that they got ideas from all countries in the world, and a great many of them imbibed different ideas, some from the Renaissance, and some from the Gothic. The ancients of the earlier centuries had more or less copied one another. He himself did not believe in originality in architecture at all. He had never seen anything that was quite original,—not even in the work of Sir Christopher Wren, for nearly all the detail of Wren's work was to be found in Italy; as far as he could see, that great man and very successful architect had all the details at his fingers'-ends and in his head, and had been able to put them together in a different way. To take a modern building, he had been to the Law Courts a great many times, but he had not seen any single bit of detail that was absolutely original; and nearly all our finest buildings were more or less imitations of other buildings. He thought that the Victorian age would some centuries hence be recognised as the greatest age of architecture that ever had been. He liked to see the individuality of thought which was shown by our buildings in the streets of the City and in other parts of London. If, however, we went to Paris, we saw very beautiful public buildings, because the Government spent a great deal of money on them, while the Government of this country would not spend money on art of any kind, and had no Department of Architecture. In Paris the Government took the public improvements in hand, and they also helped to educate the architects. The streets of Paris were very much more uniform, and the public places much better laid out, but the streets of Paris were not nearly so pretty or picturesque, and did not possess so much individuality as the streets of London. He thought the English architecture of the present day was *par excellence* that of the country-house style, initiated by Mr. Norman Shaw. In France, however, the architects did not seem to have any idea of any style adapted to a small country house.

The President, in putting the vote of thanks, said he took it that Mr. Westlake's paper was not meant to have any very distinct end in view. Mr. Westlake had not set himself to teach any very definite lesson. It was, however, a very philosophical consideration of fashion in architecture. One of the influences which guided design in architecture at the present time was fashion, whether they liked to admit it or not; and none of them could escape from fashion. He supposed not even the strongest designer in architecture could get away from the fashion of the moment, although he might guide it and mould it, to a certain extent, to his own ideas. In former ages tradition exercised a much greater influence on design, but since that was dropped, and we began to copy previous styles, more or less, that influence had been lost. Besides the influence of fashion, there now only remained to them the primary influences of materials and situation, and the circumstances generally with which architects had to comply. Mr. Westlake's paper was intended to deal exclusively with the question of fashion in architecture. A good deal of discussion had turned upon some remarks made by Mr. Waterhouse as to the influence of facilities of inter-communication on architecture. He did not understand Mr. Water-

house to say that such facilities ought not to influence architecture, but that they were bound to influence it, as they influenced language and even the character of men. Mr. Woodthorpe had spoken of the question of originality in architecture. He did not think that Mr. Woodthorpe meant to say that he altogether disliked originality in architecture. He (the speaker) took it that he only meant the originality which was forced and for its own sake.

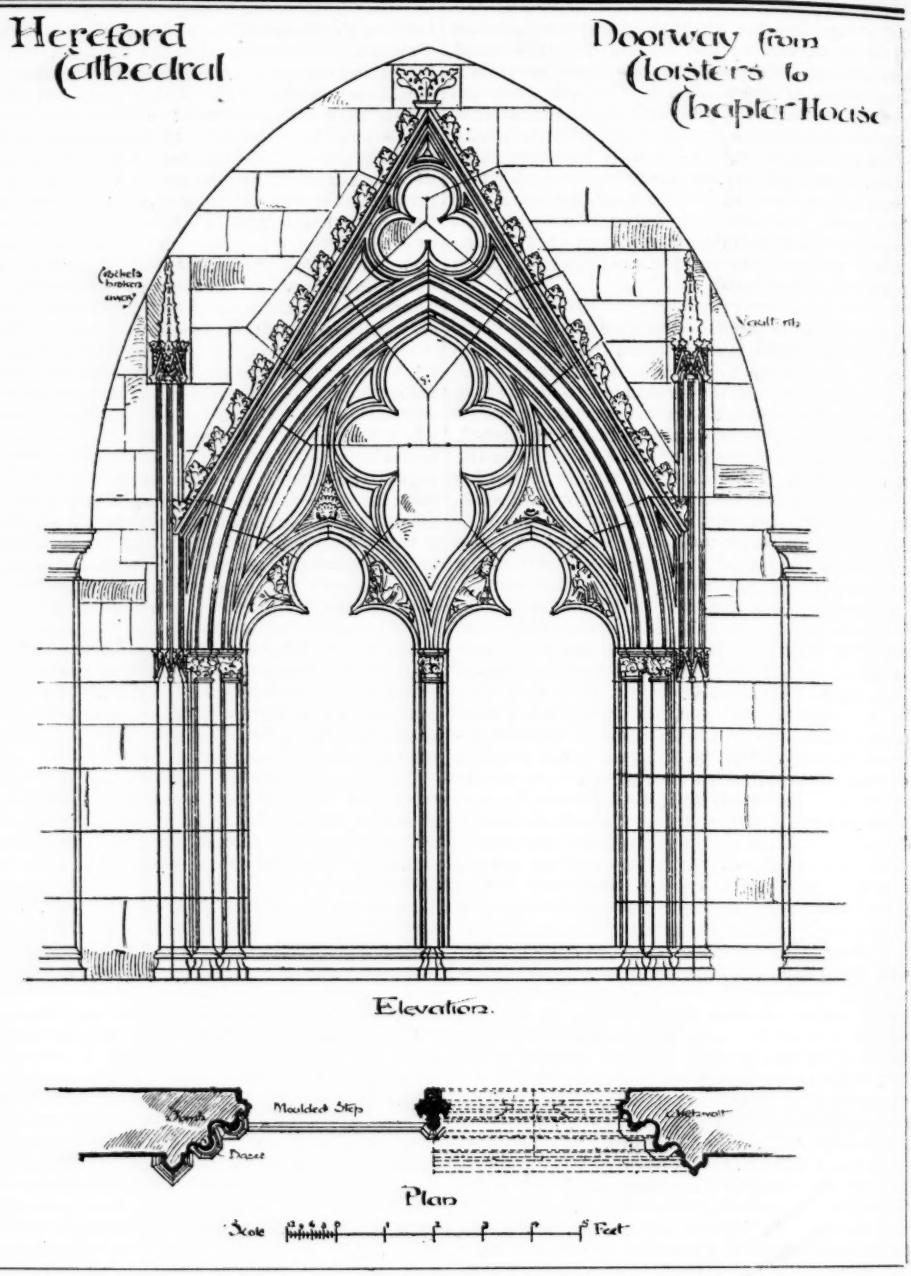
Mr. Woodthorpe said what he said was that he did not believe that there was anything in architecture perfectly original.

The vote of thanks having been passed, the meeting terminated.

Illustrations.

HEREFORD CATHEDRAL.*

IN general outline as well as in detail the Cathedral at Hereford bears strong evidence of its Norman foundation, and the "sturdiness,"—if it may be so termed,—of its exterior is largely due to the considerable remains of the earlier church which we find in the interior. Although there are vague accounts of a round church,—planned after the fashion of the basilica of Charlamagne at Aix-la-Chapelle,—having been erected by Bishop Losing in Early Norman times, there are now no traces above ground, and nothing in the Norman work at present existing to suggest that such a form had either been in existence or incorporated with the later work. If, indeed, it ever existed its destruction has been complete, and the present work of the Norman period is distinctly English in its form and treatment. The form and character of this Norman church is very clearly shown by the ground plan. A nave of eight bays with aisles, a choir of three also with aisles, a central tower, transept, and a sacristy on the east side of the south transept formed the chief parts of the Norman church, finished by Robert de Bethune (1131-1148). The east end was not treated as one large apse with a surrounding ambulatory, as at Peterborough, Norwich, and Gloucester, but each alley had its own apse, a small one at the end of each aisle, and a larger one projecting eastward from the present eastern arch of the presbytery. Of this church, the apses eastward have gone, and the greater part of the aisles of the choir, and both those of the nave; the north transept has been for the most part remodelled and extended, and the westernmost bay of the nave has entirely disappeared. In 1786 the western tower fell and ruined the front, and Wyatt, who had already been busy with deeds of Vandalism at Salisbury, was called in and rebuilt the west front, but shortened the nave by a bay, and availed himself of this opportunity to remove all the Norman work above the nave arcade and substitute a design,—if it be worthy the name,—of his own. The gradual developments which took place after the Norman period bear, as is natural, a strong resemblance to similar alterations which were going on at other buildings of the same class during the same time. The alterations, as in other cathedrals, took the form of eastward extension, and the rebuilding of the aisles was no doubt considered necessary owing to the gloom of the Norman work, which, even with the later windows, is still a characteristic of the Hereford Presbytery. The work attributed to De Vere (1186-1199) is, as may be concluded by its date, of Transitional character, and bears a strong likeness to the well-known work at Glastonbury Abbey. These alterations entailed the sweeping away of the three Norman apses already mentioned, and De Vere, not contented with a simple elongation of the presbytery aisles, doubled them, thus making two side chapels in each transept (for such it in fact was). How the centre portion was treated is mere conjecture, but the late Sir G. G. Scott, in his paper read before the Archæological Institute in 1877, suggests that the central part projected one bay beyond the sides. One peculiar feature in this work of De Vere's was the placing of columns in the centre of the central division. When we consider the distinctly unsightly appearance that the central column even now presents, placed as it is in the centre of the east arch of the presbytery, there can be



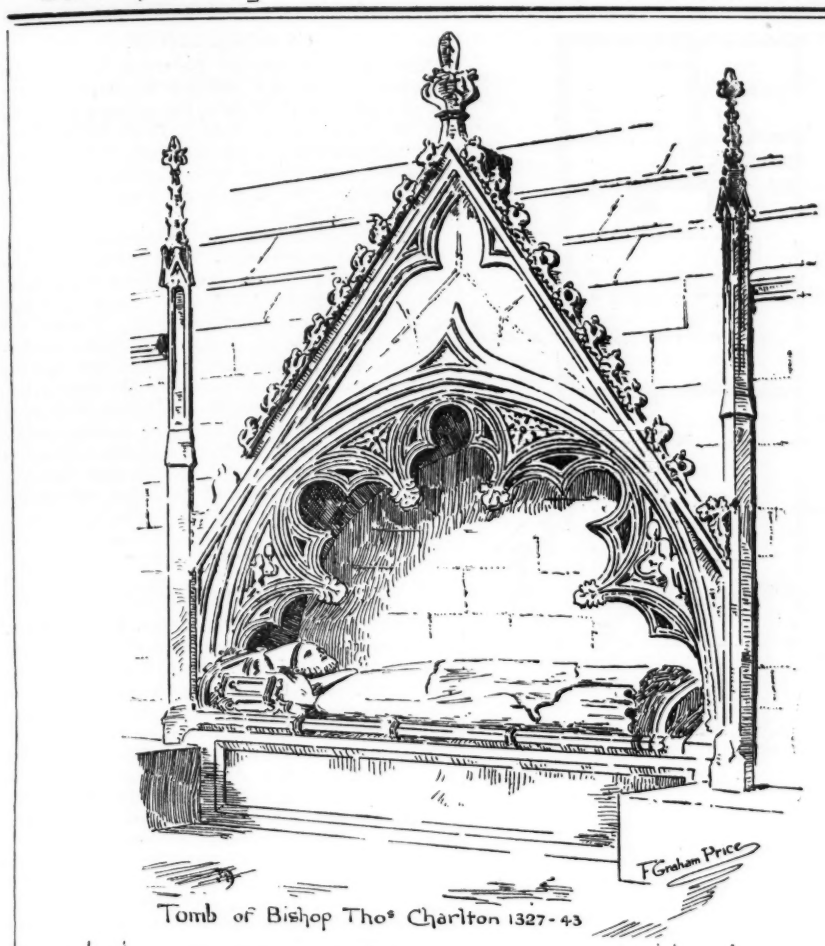
but little doubt that the portion we have now was only the commencement of a larger scheme, which included the rebuilding of the presbytery and dividing the eastern wall into two arches instead of one, as was the case later at Chichester, Lichfield, and Exeter. This scheme, however, was destined never to be realised, and the building which followed partook more of the character of alterations on the old lines than of additions or new schemes involving alteration of plan. The Early English Lady-chapel was an extension of De Vere's work (if we are to accept Sir Gilbert Scott's theory), but its having been raised on a crypt adds interest to this part of the church, as being a unique example of its date. The great work of the latter half of the thirteenth century and the beginning of the fourteenth was the rebuilding of the north transept. This very beautiful part of the church has always been associated with the name of Bishop Aquablanca (1240-1268), whose tomb is one of the finest in the Cathedral. The Norman work of the transept was pulled down entirely, with the exception of the arches leading into the aisles of nave and choir. The new transept was of two bays with an eastern aisle, this aisle having a story over, now used as a library, and approached from the north aisle of the Presbytery by a staircase turret. This transept is well known from the peculiarity of its "straight-sided" arches, and the great length of its windows in the western wall. The triforium stage is very elaborately diapered, but this part of the design suffers from the thinness of its tracery, which is very striking as seen from below.

The Decorated period has left its mark in the beautiful central tower, and in the aisles and eastern chapels. These latter should be considered first, as being probably the earlier parts. It amounted chiefly to a remodelling of De Vere's work. The bases of his piers and responds were allowed to remain, and are still visible, and, upon the former, octagonal columns were erected to carry the vaulting, and the windows were altered throughout. The aisles of the nave seem to have been rebuilt at the same period, and the windows are all of Decorated design.

The central tower, one of the glories of the Cathedral, is a fine example of Decorated work, and covered with a profusion of ball flower ornament. Like the central tower of Salisbury, it probably owes something of its design to the earlier lantern of Pershore Abbey, not in this case far distant. The likeness is most noticeable in the disposition of the upper windows, and the character and position of the dividing pilasters and bands of ornament. Allowing for the alteration of detail consequent on development of style, the resemblance is striking. Pinnacles placed diagonally take the place of the partly-engaged octagonal turrets which make Salisbury's resemblance to Pershore more apparent, and large angle pinnacles rise above these, leading to the great central spire which formerly existed. It is shown,—although only as a timber one covered with lead,—in old prints of the Cathedral. Hereford, however, before the catastrophe of 1786, possessed two towers, that at the west end being, if we are to credit the old prints, of a very similar design to the existing central one, but rising only one stage above the nave leads. This was, in all probability, used as a belfry; whereas the central tower was a lantern. It is now open to the church as far as the belfry stage, and exhibits what has been called "pillar construction," as may still be seen in the upper stage at Lichfield and Wells, an expedient adopted for lessening the weight on the arches below. This is well shown in a section in Britton's book on the Cathedral.

The only other portions of the Cathedral of Decorated date are the inner north porch (as

* This series of illustrations of the Cathedrals of England and Wales was begun in our issue of January 3, 1891. A list of those already illustrated, with particulars of future arrangements, will be found on page 112.



Tomb of Bishop Thos Charlton 1327-43

TOMB OF SIR RICHARD PEMBRIDGE

The Font

distinct from Bishop Booth's addition) and what remains of the chapter-house. The north porch, especially in the doorways, has some very delicate detail, and what remains of the chapter-house shows it to have been a very beautiful piece of design. We here give an elevation of the entrance to it from the cloister, from a drawing by Mr. H. D. Walton. The chapter-house itself was, as will be seen by the plan, a decagon, each side (except the one occupied by the entrance) being sub-divided into five panels or seats. Remains of three sides only are left, and even these only as far as the window-sills, and in a very ruined state.

The remaining portions of the Cathedral are additions made in the fifteenth and sixteenth centuries. The Chantry-chapel of Bishop Audley (1492-1525) is placed on the south side of the Lady-chapel, and is in the form of a semi-octagon, two stories in height, with an elaborately panelled screen towards the Lady-chapel. Bishop Booth (1516-1535) lengthened the great north porch, and his design, although later in date, somewhat resembles the porch in the centre of the west front at Peterborough Cathedral. It is a very bold piece of Perpendicular work, the outer arch having richly-panelled spandrels and a large five-light window over. Octagonal turrets flank the entrance on either side, and contain staircases which lead to the room over the porch. An earlier addition of the Perpendicular period is the chapel of Bishop Stanbury (1453-1474), approached from the north aisle of the presbytery, and richly panelled and vaulted. Some additions were made to the Norman sacristy, on the east side of the south transept, in Tudor times, lengthening it a bay eastward, and placing a turret in the angle leading to an upper story. It was used for some time as a chapter-house, but is now a vestry.

The cloisters are on the south side of the nave, and of three walks, two,—the east and south,—remain, and are of late Perpendicular date. Against the south wall, towards its east end, are some remains of two Norman chapels dedicated to SS. Katherine and Margaret. A second cloister, known as the Vicar's Cloister, connects the Vicar's College with the south-east transept. The arrangement here is interesting to compare with Chichester, as showing the probable arrangement there before the destruction of the south walk, and its connection with the cloister of the Vicar's Choral.

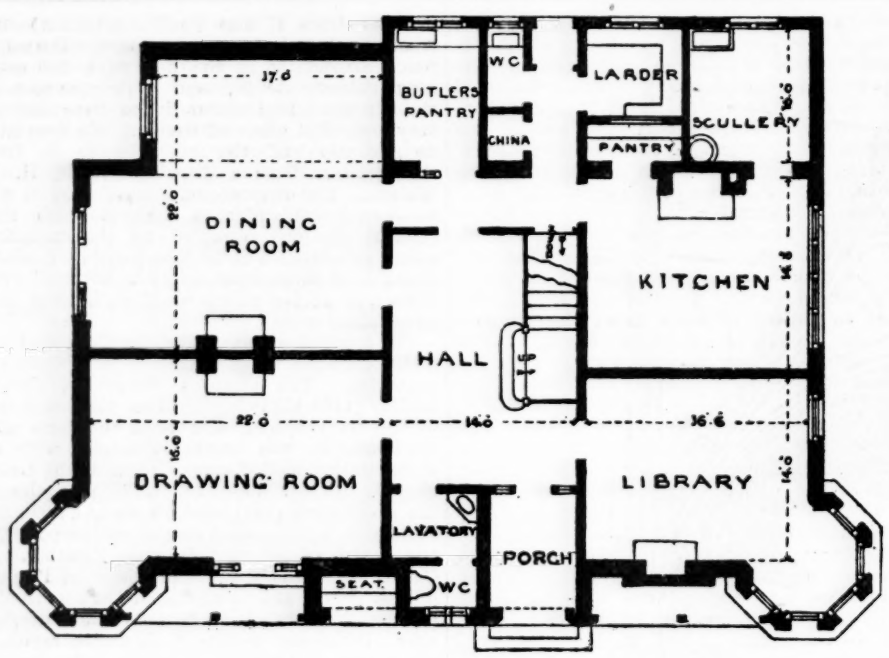
It now only remains to notice the objects of interest in the Cathedral. A very large and interesting series of episcopal and military effigies exist here. Amongst the former, the beautiful tomb of Bishop Aquablanca, in the north aisle of the choir, stands first, with its delicate detail and simplicity of design. Near it is the base of the shrine known as the Cantilupe shrine, but thought by some to be the remains of the shrine of St. Ethelbert. It consists of two stages, the lower having a series of cinquefoiled niches and fourteen figures of Templars in chain armour, and the upper an open arcade, the slab inside still bearing the matrix of the brass of an episcopal figure having traces of the arms of the See (those of Cantilupe), and another space formerly occupied by a brass figure of St. Ethelbert, now in the sacristy east of the south transept. The traces of where the shrine fitted in on the top are still visible. The material is a fine sandstone.

Amongst the other monuments worth particular notice are those of Bishop Charlton in the north transept (here illustrated),* and Bishop Stanbury's tomb on the north side of the Presbytery opposite his chapel, with some good heraldic work, one of which bears the arms of the See.

Another good monument is that of Sir Richard Pembridge in the nave,* formerly at the Greyfriar's Monastery, but removed here at the Suppression. He was a Knight of the Garter in the time of Edward III., and died 1375. Hard by is the Norman font,* a circular bowl ornamented with mutilated figures of the twelve Apostles. On the opposite side of the church, near the porch to which he added, is the tomb and effigy of Bishop Booth.

On the north side of the Lady-Chapel is a fine monument hitherto ascribed to Humphrey de Bohun, and so called in the reference on the plan, but said in the guide to the Cathedral, by Rev. Francis T. Havergal, to be the monument of Peter Baron de Grandisson who died 1358. There is a very fine recumbent effigy, and, on the canopy, statuary representing

* These three illustrations are from drawings by Mr. F. Graham Price.

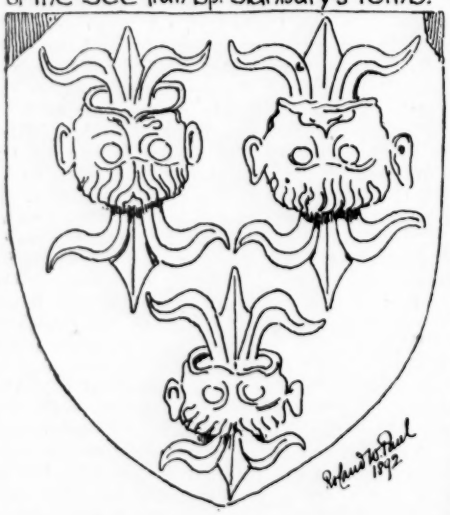


—GROUND PLAN—

Villa, South-hill Park, Bromley, Kent.

the crowning of the Virgin in the centre, with figures of King Ethelbert and St. John the Baptist on one side, and St. Thomas à Beckett and Bishop Thomas de Cantilupe on the other. The choir-stalls are largely ancient, with good canopy work and quaint misereres. The screen and reredos are, however, modern, the former of metal, from the design of the late Sir G. G. Scott, and the latter one of the additions made during the restoration by the late Mr. Cottingham. Immediately north of the altar is placed the ancient bishop's chair, attributed to the twelfth century. Scattered about the eastern end of the Cathedral are several fragments of stained glass, some of the best, apparently of

Hereford Cathedral - The Arms of the See from Bp: Stanbury's Tomb.



early fourteenth century date, being in one of the lancets on the south side of the Lady-Chapel, west of the Audley Chapel, having a Majesty and the four evangelistic symbols, besides other fragments of interest. There are also some figures of saints in the windows of the eastern transepts, but not of a very high order of merit, although apparently of fourteenth-century date.

The ground-plan of the Cathedral which we publish to day has been reduced from a very carefully plotted quarter-scale plan by Mr. William E. Martin, and kindly placed at our disposal by Mr. Kempson, of Hereford. To this have been added the cloisters and chapter-house, as they exist at the present time. We have to acknowledge also much help and valuable information received from Mr. St. John Hope and Mr. Gordon Hills. A paper by the latter in the Archæological Association "Proceedings" of 1871 is a very valuable and exhaustive account of the building.

ILLUSTRATIONS OF OLD CHESTER.

I.—FIREPLACE IN BISHOP LLOYD'S PALACE.

THIS fine apartment, originally forming one of a suite in Bishop Lloyd's Palace, has evidently been approached by a handsome staircase and hall, now removed, except the large window and ornamental plaster ceiling. The room is about 32 ft. by 17 ft. by 13 ft. 6 in. high to the ceiling. The floor is of oak. The panelling is deal painted, which appears to have been general throughout the street. It extends along the side occupied by the fireplace, and about half the opposite side.

In the north wall are three windows, which, being rather small, do not light the room sufficiently; between the windows are panels. The south wall, with the entrance doorway, has been brought forward into the room, reducing its length about 6 ft., and is perfectly plain. The fireplace is entirely of red sandstone, and is surmounted by a broken pediment and phœnix, and is carried above the line of ceiling, which is coved to receive it. The cove is enriched. The plaster ceiling is delicately treated, but has been much injured by repeated coatings of distemper, otherwise the room is in very good preservation.

The adjoining room, with which this communicated, will form the subject of another illustration in the series. T. P. IVISON.

VILLA, SOUTH-HILL PARK, BROMLEY, KENT.

THIS villa, built as a private residence at Bromley, is faced with red bricks up to first floor, and rough-cast and half-timber work above same. The position is a high one, and the oriels and turrets command good views of the adjoining country. The cost was about 2,200*l.*, Messrs. W. A. Williams & Hopton, of Bromley and London, being the architects.

The contractors are Messrs. Baxter, Payne, & Lepper, of Bromley.

HOUSE, No. 79, FORE-STREET, REDRUTH, CORNWALL.

THE rebuilding of these premises has recently been completed, local stone being used for the walling, with Portland stone dressings, cornices, strings, &c. The works have been carried out by Mr. Arthur Carkeek, of Redruth, from the designs and under the supervision of Mr. Hubert A. Gregg, A R I.B.A., of London.

THE CITY ARCHITECTSHIP, ABERDEEN.—Baillie Rust will, it is understood, at once intimate his resignation as a member of the Town Council in order to become a candidate for the City Architectship. Messrs. Matthews & Mackenzie, architects, are also candidates for the office.—*Aberdeen Free Press.*

COMPETITIONS.

TRUANTS' SCHOOLS, LICHFIELD.—In the competition for the Midland Truants' Schools, to be erected at Lichfield, the plans sent in by Mr. R. Stevenson, Burton-on-Trent, under motto of "Adaptability with Economy," have been accepted, and he has been appointed to carry out the work. Mr. E. R. Robson was the assessor in the competition

CHACEWATER CHURCH RESTORATION.—The *Cornwall Gazette* says that plans for the restoration of Chacewater Church have been submitted by six architects. These are now under the consideration of Prebendary Hingeston-Randolph, who has kindly undertaken to act as assessor. Should his opinion confirm the selection made by the committee, it is hoped that the work will at once be open to tender, and the building in a contractor's hands in the early spring. So far 1,100*l.* has been contributed, but it is to be hoped that the additional sum required will be subscribed before the completion of the work.

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION.—A meeting of this Association was held on the 28th ult., Mr. John Kinross, the President, in the chair. A letter was read from the First Commissioner of Works regarding the condition of Linlithgow Palace, and notice was given of the following motion, to be submitted to the next meeting of the Association:—"That this Association, in acknowledging the communication from the First Commissioner of Her Majesty's Works of date December 29 last, intimating that he had caused a sum of 250*l.* to be provided in the estimate of the Department for the ensuing year 'in order to admit of the more urgent and special repairs of the Palace of Linlithgow being carried out at an early date,' begs to thank the First Commissioner for having taken action in the matter, and to express its satisfaction that the immediate necessity for certain repairs has thus been recognised; but, looking to the exceptional importance of the Palace in regard both to the history and architecture of Scotland, the Association feels that the thorough repair of the entire fabric is the only proper course, and begs respectfully to represent that such thorough repair can only be properly carried out by replacing the burnt timbers and flooring, reglazing the windows, and covering the whole with a roof, so that the walls may be firmly tied together, and the whole rendered wind and water tight." The meeting then proceeded to consider the following motion, moved by Mr. G. S. Aitken:—"That this Association, in view of the recent architectural changes made in the approach to the Register House, is of opinion that the Wellington statue in front thereof should be removed, and that for the following reasons, viz.:—(1) It is an obstruction to the thoroughfare; (2) it is out of scale with Adam's fine building; (3) it is incongruous with its surroundings; (4) its merits as a work of art are not advantageously displayed in its present position." After some discussion, the matter was remitted to the Council of the Association for further consideration.—Mr. Hippolyte J. Blanc then read an interesting paper on "Heriot's Hospital and Cotemporary Work."

GLASGOW ARCHITECTURAL ASSOCIATION.—The fifth lecture of the session was delivered by Mr. James Lindsay, A.R.I.B.A., on the 28th ult., his subject being "Approximate Estimating." The President, Mr. Wm. J. Anderson occupied the chair. The lecturer's endeavour was to give some helpful hints to architects called on to approximately state the cost of some building without awaiting contractors' exact estimates. The capabilities of the cubing system were discussed. If from some existing building of a similar character to the one proposed is obtained its price per cubic foot, that applied to the bulk, as found from plans of the other contemplated, ought to approximate pretty nearly to its cost. The difficulty was to find the nearest precedent, and even when found error was made when simple contraction of bulk was expected proportionately to reduce the expense. The features in which lie the chief expense must be reduced rather than the mere walling, roofing, and flooring. Another system,—superficial measurement,—was described, with illustrations on the blackboard. At the close of the lecture a discussion followed, and the customary thanks were voted to Mr. Lindsay.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—At a meeting of the Leeds and Yorkshire Architectural Society on Monday night, Mr. F. W. Bedford read a paper entitled "Some Account of the Arts in Southern Italy and Sicily." Mr. W. H. Thorp, President of the Society, introduced Mr. Bedford, who, he explained, had spent a considerable time studying the architecture of Spain, Southern Italy, and Sicily. Mr. Bedford illustrated his lecture with photographic views thrown upon a screen, and the audience were much interested, especially in the very complete Pompeiian series which the lecturer possesses.

THE SOCIETY OF ENGINEERS.

THE first ordinary meeting of the Society of Engineers for the present year was held on Monday evening last, at the Town Hall, Westminster. Mr. W. N. Colam, the President for 1891, first occupied the chair, and presented the premiums of books awarded for papers read during his year of office, viz.:—The "President's Premium" to Mr. G. M. Lawford for his paper on "The Drainage of Town Houses." The "Bessemer Premium" to Mr. J. H. Paul for his paper on "Corrosion in Steam-Boilers." A "Society's Premium" to Mr. John Kerr for his paper on "Portable and Pioneer Railways."

Mr. Colam introduced the President for the present year, Mr. Joseph William Wilson, jun., to the meeting, and retired from the chair, receiving a hearty and unanimous vote of thanks for his services during the past year.

Mr. Wilson then took the chair, and upon his proposition, seconded by Mr. Colam, a vote of condolence with the Queen and the Prince and Princess of Wales in their recent bereavement was agreed to.

Mr. Wilson then proceeded to deliver his inaugural address. After returning thanks to the members for electing him as their President, and calling upon them for their co-operation in advancing the growing prosperity of the Society, he reviewed the work done under its auspices during the past year, during which time the number of members of all classes had increased more than 9 per cent.; Sir George Barclay Bruce, Past President of the Institute of Civil Engineers, having been elected to the vacancy in the roll of Honorary Members occasioned by the lamented death of Earl Granville. The chief points of interest in the papers read and discussed during the year were then touched upon, and reference was made to the professional visits undertaken during the summer, which included those to the Ice Works of the Linde British Refrigeration Company, at Shadwell; the City and South London Electric Railway Company's Stockwell Depôt; the Royal Engineers School of Military Engineering, at Chatham; the Shortlands and Nunhead Railway Works; and the Crystal Palace Gas Company's Works at Lower Sydenham. The President then referred to the growth of the population of the world and the corresponding development of engineering enterprise; and to the present unsatisfactory condition of the London sewage question, in reference to which he had received from Sir Robert Rawlinson an epitome of his solution of the sewage disposal as being "Out of the River Thames and into the Sea over Maplin Sands." The work of the recent International Congress of Hygiene and Demography, especially in reference to the section of "Engineering in relation to Hygiene" was touched upon, and it was felt that, although much had been done, much still remained to be accomplished in relation to not only sewerage disposal, but also the adequate supply of water to, and the prevention of smoke in, London. The President then enumerated the proposed railways in and around London; and, pointing out the great need that existed for these and other methods of relieving the overgrown street traffic, urged the necessity for a conference of competent authorities in order to decide upon some definite scheme of gradual re-organisation for existing London, with a due regard to its systematic outward development. He then dealt with increasing railway speeds and the connexion of the question with the recent Norwood Bridge accident, and the consequent re-construction of many railway bridges on the lines throughout the country; and he advocated a more general adoption of the plan utilised on the Forth Bridge of laying the rails in iron troughs so as to avoid the lamentable accidents at present produced by a train leaving the metals when crossing a bridge and immediately crashing through the floor. The rapid increase in third-class passengers, and the gradual disappearance of second-class carriages, and the approaching abandonment of the remainder of the broad-gauge system were touched upon, and Mr. Wilson proceeded to consider the important engineering development of subaqueous tunnelling. Tunnels had already been successfully carried beneath the St. Clair River in America, and the Severn and Mersey Rivers in England, and the Blackwall Tunnel beneath the Thames was about to be commenced; besides which there were many such works proposed in various parts of the world; the most important schemes being for tunnels beneath the sea, of which that designed by Sir Douglas Fox for connecting Prince Edward's Island with New Brunswick was likely to be the first actually constructed; and he proceeded to give particulars of this, with approximate estimates for the various diameters designed for alternative conditions of traffic. Extracts from the latest reports of Sir John Fowler and Sir Benjamin Baker upon the maintenance and present satisfactory condition of the Forth Bridge were given, and allusion was made to the approaching completion of the Manchester Ship Canal, the Tower Bridge, and the Liverpool Overhead Railway, and the commencement of the Dover Harbour Completion Works, and the Harbour and Improvement Works at Ramsgate; and, after referring to the Crystal Palace Electrical Exhibition, which promised to outshine all previous Exhibitions, and where the development of electrical machinery was so prominent a feature, the President concluded by dealing with the question of engineering education, with which he had been intimately associated during the last twenty years; emphasising the fact that the true solution of the question is to be found only in a judicious and simultaneous blending of theory and practice, under the highest *personal* supervision; and that success would be ensured to the engineer if he would but "deserve it" by an honest and unwearied application of all his energies of mind and body to the requirements of his great profession throughout his career.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday last, the Chairman, Sir John Lubbock, presiding. The greater part of the sitting was taken up by a discussion on the incidence of local taxation.

Appointment of an Assistant Medical Officer of Health. — On the recommendation of the General Purposes Committee, Dr. W. H. Hamer was appointed Assistant Medical Officer of Health, at the commencing salary of 500*l.* a year, rising to 600*l.*

The Valuation of Land.—The Special Committee on the Valuation of Land presented a report recommending the appointment of a central assessment committee under the direction of the County Council, to have the same powers as the surveyor of taxes under the Act of 1869, together with other powers giving them authority to secure through the local assessment committees uniformity of assessment throughout the metropolis, and the separate assessment of all land in the county, irrespective of buildings and improvements, and authorised to appoint an assessment clerk to act as their agent. The Committee believed that even under existing Acts all land ought to be rated on its value, and recognised the fact that land not yet built upon had not in practice been rated according to its value, and they proposed that legal advice should be taken as to whether such practices were legal, and could only be altered by new legislation. In the event of counsel advising that such legislation was required, the Committee recommended that application should be made to Parliament to obtain powers authorising rating authorities and assessment committees to calculate for rating purposes, not only the annual rent, but also the capital value of land, and to assess the property either on the rent "which a tenant might reasonably be expected to pay," or on a statutory percentage of the capital value. The Committee further recommended that this report should be referred to the Parliamentary Committee with instructions to take measures for obtaining from Parliament during the present Session such powers as might be required to carry out the foregoing recommendations.

The recommendations were adopted.

Enlargement of Banstead Asylum—On the recommendation of the Asylums Committee, it was resolved to provide further infirmary accommodation at Banstead Asylum, at an estimated cost of 14,000*l.*, from plans prepared by Mr. G. T. Hine, the architect of the Claybury Asylum, now building.

Regulations for Ensuring the Public Safety in Theatres.—The Theatres and Music-halls Committee brought up a series of regulations for ensuring the safety of visitors to theatres, music-halls, &c. The consideration of the subject was postponed for a week, and,

After transacting other business, the Council adjourned.

ARCHÆOLOGICAL SOCIETIES.

LANCASHIRE AND CHESHIRE ANTIQUARIAN SOCIETY.—The annual meeting of the Lancashire and Cheshire Antiquarian Society was held on the 29th ult. in Chetham's College, Manchester, presided over by W. E. A. Axon. Mr. W. Harrison (in the absence of the hon. secretary, Mr. G. C. Yates, F.S.A.) read the annual report, which stated that the steady growth in the number of members maintained until last year had been arrested, but in other respects the success which had attended previous years had continued. The total number of members now was 337—283 ordinary, 49 life, and 5 honorary members. The Duke of Devonshire was unanimously elected President of the Society, and Mr. T. Letherbrow and Mr. G. C. Yates were re-elected treasurer and secretary respectively.

LEICESTER ARCHITECTURAL AND ARCHÆOLOGICAL SOCIETY.—The annual meeting of this Society was held on the 25th ult. Mr. W. J. Freer, hon. sec., read the thirty-seventh annual report, which mentioned the fact that seventeen new members had been elected.

Books.

The Maintenance of Macadamised Roads. THOMAS CODRINGTON. Second Edition. London: Spon, 125, Strand.

AS a reliable handbook Mr. Codrington's "Maintenance of Macadamised Roads" has been universally recognised since its publication twelve years ago. The exhaustion of that edition has consequently produced a second, for which we have been waiting with some degree of expectation. In the meantime Mr. Codrington, as one of the Engineering Inspectors of the Local Government Board, made a "Report on Road Maintenance" to that Board, which was published "By Authority," and sold to the public in the form of a pamphlet at the time of the birth of the first County Councils. This second edition incorporates in some measure the contents of that pamphlet, which brought road-matters a little more up to date, but incorporates little else. What the cause for this may be we know not, but it cannot be otherwise than a regrettable circumstance that the issue of a new edition of this deservedly popular work was not made the occasion for introducing much that would have added to it value.

It may be interesting to know that the cantonniers,—the men who are charged with the manual labour connected with the maintenance of the roads in the cantons of France,—wear blue jackets and leather hats, "round which shall be a band of copper, 0·28 in. long and 0·555 in. broad;" that their punishment for a first offence of absence is the loss of three days' pay; for the second similar offence, a loss of six days' pay, and for the third offence dismissal; that from May 1 to September 1 they *begin work at 5 a.m. and cease at 7 p.m.*; and that they have to plant a staff on the roadside within a short distance of where they are working, so that a man can be found in case he has gone for a doze into a shady and adjacent wood. All this, and more, is included in the "Regulations for Cantonniers," which forms Appendix I. of the volume under notice. A perusal of those "Regulations" may afford some faint guide for a frame on which to weave a code of laws for roadmen; but what it chiefly does is to furnish grounds for doubt whether such stringent semi-military regulations would be acceptable to, or accepted by, the class of man who it is understood is to be the future model roadman of this country. Nevertheless, there is something to note in them, and it was well to append them to the work. The magnitude of the subject, from a financial point of view

may be appreciated from the following statement:—

"The annual taxation returns now show a total expenditure in England and Wales of upwards of 5,500,000*l.* a year on highways, street improvements, and turnpike roads. Of this amount, 2,000,000*l.* is expended by highway authorities in rural districts, almost entirely on macadmised roads. The other 3,500,000*l.* is expended in the metropolis and by urban sanitary authorities."

A very sensible proportion of this three-and-a-quarter millions is, of course, also expended on macadamised streets in the towns and cities of the country. Why, in treating of the value of a binding material, a quotation from Mr. Deacon's paper in the Proceedings of the Institute of Civil Engineers has been placed under the head of rolling instead of under that of binding, it is not easy to discern, nor why it is there alluded to as a *blinding* instead of a binding for macadam.

We are glad to see a little,—though a very little,—more information about the machine tests adopted in France by the road authorities, and hope that the time may not be far distant when the Local Government Board, or the County Councils' Association, or some large Municipal or County Council, whose expenditure on these matters is very considerable, will take up this branch of the subject, purchase or construct machines, either on the French or any other suitable designs, and carry out tests, which are bound to be of very great assistance to them.

To this part of the work a little more care in the revision of proof would have prevented the publication of such peculiar formulæ as:—"Grammes of detritus: 20 = 20: coefficient, and 3,000: crushing weight per square centimètre = 20: coefficient."

The author ought to have been aware that the stone of Mount Sorrel is not a hard trap. An error of this kind is important, as it much disturbs the value of the subsequent information relating to the cost of crushing by machinery, the details of cost given being naturally assumed by a reader to be those for breaking a hard trap, which is not the case. We are aware that quarry owners might reasonably object to furnishing for publication the details of cost of the operations which go on in their respective quarries, but the way in which this branch of chapter iii., viz., "Stone-breaking by Machinery," has been treated by the author is altogether inadequate to its importance; in a great measure it is a piece of ancient history.

The fact of the "Cost of Road Material" having been condensed into a page and a half, as in the first edition, will also give a correct notion of the adequacy of treatment of that part of the subject.

There are some useful observations on the merits of the artificial application of water to roads, and as this matter is one on which the author has on several occasions had to adjudicate as an arbitrator, it is well to know his published opinion, as follows:—

"For the sake of the road itself, a road, except one of a silicious nature, seldom requires watering in this country." The contention of urban surveyors on this point of dispute between them and county surveyors would not, therefore, be deemed by him to be of great weight.

A small amount of additional information is given respecting the cost of road maintenance in the metropolis, and a good deal more about the cost of roads elsewhere, and this chapter is on the whole more complete and better revised than most other portions.

The section which relates especially to road management,—*i.e.*, the *systems* of road management,—has also received beneficial additions, and we fully endorse the strictures passed on contracting for road management. With a good surveyor,—*i.e.*, a man who knows and does his work and is honest,—no contract for maintenance can be necessary, nor can a contract in such a case be other than a discreditable extravagance.

In spite of the deficiencies and blemishes to which we have been compelled to draw attention, this is a work far ahead of any other of its kind. It will still probably hold its own as the best handbook on the subject.

The Art and Craft of Cabinet-making. By David Denning. London: Whittaker & Co.

This useful work forms one of Messrs. Whittaker's series of practical manuals on the arts, sciences, manufactures, and industries, and the author states in his preface that his intention has been to supply "amateurs and young professional cabinet-makers with a reliable guide to the construction of cabinet-making." This the author may be said to have done in a very clear and concise manner, and the chapters dealing with the craftsmanship of his subject may be praised without reservation. The title is a taking one, as at the present time the connexion between artists and craftsmen is receiving the attention of the former in the attempt to make the crafts fine arts. This book may be confidently recommended to the furniture-building architects of the day. The descriptions of the use of tools, the materials, and the methods of workshop practice are admirably explained, and the knowledge of these principles of handicraft cannot fail to assist these architects in their ardent wooing of the craftsman. It cannot be claimed, however, that Mr. Denning's book will throw much light upon the methods of designing really (not so-called) artistic furniture; for the promise which the title of the book holds out is not redeemed in the text. The book contains many illustrations of articles of furniture, most of which seem to be reminiscences of Tottenham-court-road. The principles of good design do not appear to have been grasped by the author, and many of his remarks in this direction might easily be misleading. The perusal of Mr. Denning's book emphasises the gulf existing now-a-days between the designer and the craftsman who executes the work, each failing at times to comprehend the difficulties arising in the province of the other, and the question naturally arises as to whether it is possible, with our existing institutions and their developments, that the good old days shall return, and the craftsman be an artist who is equally alive to beauty of form and colour, and the precision of craftmanship necessary for its execution.

The London Householder's Chart: Public Health Act, 1891. By T. Miller Maguire, LL.D., Barrister-at-Law. London: Simpkin Marshall & Co.

This is little more than a pamphlet in size, but may be a very useful one to many householders. It contains a brief statement as to the working of the Public Health Act as it will affect householders, directing them what to do and to whom to apply in specified cases, and to whom and to what extent they are liable for infringements of the Act &c. There is a list also of the districts in which the Vestry is the Sanitary Authority, and those in which the District Board is the Sanitary Authority; an existing irregularity of administration which is a puzzle to many. It will be found a very useful little manual of facts put into a small compass.

The Metropolitan and Provincial Local Government Annual and Diary, 1892. London: S. Edgcumbe-Rogers, Dorset House, Salisbury-square, E.C.

This is the first appearance of what is likely to prove an exceedingly useful and convenient publication. The object of the editor, Mr. Edgcumbe-Rogers, as he tells us in the preface, has been to give within the two covers of this book (the price of which is 1s. 6d.) information "which previously could only be obtained by buying some four or five different volumes ranging in price from 2s. to 15s., at a total cost of £2." The first in order of the many useful features of this diary is "The Local Government Remembrancer," which sets forth the duties to be discharged by public bodies and officials in each month of the year. Then follows a list of the chief officials of the Local Government Board, and this, in turn, is succeeded by lists of the members and chief officers of the London County Council, the Metropolitan Asylums Board, the School Board for London, and the Corporation of London; then comes a list of the various District Boards of Works and Vestries, with the names of their officers, and a variety of other information. The country section is commenced by a list of associations connected with local government, with their chief officers. Then follow the Municipal Corporations, with the names of the new Mayors, the Town Clerks, and Surveyors. The County Councils, with the names and addresses of the Clerks and Surveyors, and the country Unions, with the names and addresses of Clerks and the Masters, are given in a clear form. Everything appears to be up to date. Among the forty-one distinct features of the book are to be found information about the City Companies, the District Surveyors, burial boards, cemeteries, coroners, sick asylums, county-courts, police-courts, baths and washhouses, public libraries, gas, water, and electric light companies; public parks, and port sanitary authorities. The book, which includes a diary of three days to the page, may be strongly commended to the attention of all who are engaged in the work of local government, and will be especially useful to the intelligent ratepayer.

Correspondence.

To the Editor of The Builder.

THE JEW'S HOUSE, LINCOLN.

Sir,—The reason why the "Jew's House" at Lincoln, of which you have recently given an illustration from Mr. Powell's drawing (January 9), is so called, is simply because it was the house of a Jew. Lincoln has two such houses, of nearly the same date, *i.e.*, about the middle of the twelfth centnry. That represented in Mr. Powell's drawing is the more perfect, but the other is the more historically interesting. It was the home of "Aaron the Jew," the prototype of the Isaac of York of Sir Walter Scott's "Ivanhoe," one of the chief, if not the very chief, of the money-lenders of Henry II.'s time, whose name is of very frequent occurrence in the legal documents of the period. The other house (that of your drawing) which stands some way further down the almost precipitous "Steep-hill," on the opposite side of the way, though built a hundred years before her time, was in the latter part of the thirteenth century the property of a Jewess named Belaset [Belle assez?], of Wallingford. This lady in 1271, betrothed her daughter Judith to Aaron, the son of Benjamin, endowing the young pair with twenty marks sterling, and a copy of the Hebrew Bible, written on calf-skin. The marriage took place four years later, in 1275, and the wedding-feast, of which we have a record, may probably have been held in this very house. Fifteen years later, in 1290, the same year in which the Jews were expelled from England, Belaset was hanged on the charge of clipping the King's coin. Belaset's messuage having escheated to the crown, was granted to Walter le Fevre of Folletby, from whom it passed by gift to Canon William de Thornton, Prebendary of Stow Longa, and was presented by him to the Dean and Chapter. On the surrender of the Chapter Estates to the Ecclesiastical Commissioners, the Jew's House became the property of that body. Applications have been recently made to the Commissioners to redress some of the damage caused by the neglect and wanton mischief of former years, and maintain so precious a relic of the Domestic Architecture of our forefathers in its integrity, but they have obtained little attention. The house is thus described by Mr. Hudson Turner ("Domestic Architecture in England," vol. i., p. 7):—"A building at Lincoln, known as the Jew's House, is a fine specimen of the period. The principal dwelling-room is on the first floor, where there is a fireplace on the side towards the street. The chimney is corbelled out over the door, the lower part with the corbels forming an arched canopy over the doorway, which is richly ornamented." He adds: "There is another house in the same street," that known as the house of Aaron the Jew, "of equal antiquity, but in a less perfect state." Both houses are described more fully on pp. 41, 42. Mr. H. Turner writes of Belaset's House, "it is small, and seems to have consisted of two rooms only, one on the ground floor, and one above" (not quite accurate: there was a back room as well as front room). "These may, however, have been originally divided by partitions." His concluding remark that "the interior has entirely lost all original character," I am happy to say, is not strictly accurate. In the northern division of the house, now occupied as a butcher's shop, in both stories a perfectly plain round-headed Norman archway, tall for its width, forms the communication between the front and back rooms, and in the north wall of the lower room is a broad, shallow Norman recess. From all of these the wall-paper and plaster by which they were obscured was stripped off, and the stonework cleaned and left bare on a recent change of tenant. Of Aaron's House Mr. Turner says:—"The same arrangement of the arch of the doorway carrying the fireplace is found here also. The Norman ornamented string, on a level with the floor, may be traced along two sides

of this house, which stands at a corner, and some windows" (only one now) "may be distinguished, but less perfect than those of the first house." I may add that a blacklead pencil drawing of this house by Mr. J. C. Buckler, executed in the exquisitely-delicate style in vogue seventy or eighty years back,—now, to my regret, quite out of fashion,—is to be found in the collections of the British Museum, in a volume containing drawings of the monumental slabs ejected from Lincoln Minster at the time of the disastrous repaving at the close of the last century and placed in the cloisters. This drawing, which in undated, depicts the house in a much more perfect state than now, with two of its Transition Norman windows on the south front in a perfect state. At a repair of the house in 1878 a similar window was discovered on the west face, and carefully restored by the Minster masons under the direction of the clerk of the works.

It is noticeable that the few examples of town houses of the twelfth century remaining in this country are almost without exception traditionally assigned to members of the Jewish community. Besides the two at Lincoln there is a very remarkable Jew's house at Bury St. Edmund's, known as "Moyses' (the Vulgate spelling of Moses) Hall," of statelier character than its fellows. The reason is that when houses in towns were, as a rule, constructed of wood and plaster, the Jews built theirs of stone as a security for their persons and their property, especially their bags and chests of coin, from the assaults and plunder to which they were continually exposed. "It is certain," writes Mr. Turner, "that in all early deeds relative to the transfer of tenements once held by Jews, those tenements are usually described as built of stone" (p. 47). "Examples, these," says Mr. Freeman, "of the stately houses of these favoured chattels of the King to which men pointed with envy as rivalling the King's own palaces" ("Towns and Districts," p. 215).

EDMUND VENABLES.

The Precentory, Lincoln,
January 26, 1892.

CONCRETE FOR ARTISANS' DWELLINGS.

SIR,—I am very much obliged by your insertion of my inquiry as to laying flooring on concrete, and to those who gave the valuable suggestions in reply.

The great importance at the present time of the question of housing the labouring classes in cities will, I trust, be a sufficient excuse for troubling you with a question or two more, which may elicit from some of your readers their experiences for the benefit of those who, like the writer, are endeavouring to solve the question of economical, and yet substantial, labourers' tenements in their own localities.

It is proposed to replace joists on upper stories by slabs of coke breeze concrete, the walls being levelled off for each story at underside of floor concrete, which would be then laid on the walls through their full thickness, and the walls of next story carried up from top surfaces of the slabs. On these slabs the flooring would be nailed.

1st. Should the breeze be used just as it is got from the gas-works, or is it necessary to remove any of the very fine part of it, or to add any other material to it, and in what proportions should it be mixed with Portland cement for this particular purpose?

2nd. What is the largest size of floor that is shown by *practical* experience to be safe without any support, except on the walls as above described, and using slabs of 5 in. or 6 in. thick?

3rd. If breeze is used for the walls, which would vary from 5 in. to 9 in. thick, would it be necessary to add any other material? and what proportion of cement should be used for wall work?

SURVEYOR.

FLOORING-BOARDS ON CONCRETE.

SIR,—I had some 1 in. yellow deal flooring nailed to 2 in. of coke breeze concrete, on a bed of brick rubbish and Portland cement concrete (6 to 1) five years ago. The whole of the concrete was left for a month to get thoroughly dry before the floor boards were nailed down. I saw this flooring about a month ago. It has stood perfectly, and is as solid to walk upon as on the day it was laid. The boards were not, and ought not to be, tongued.

C. F. M.

SIR,—I would advise "Surveyor" not to lay tongued-wood floor direct on to flat surface, either of breeze or other concrete, for the following reasons: If nailed to the concrete without intervening air space, dry-rot is almost sure to follow; and if nailed to fillets embedded in the ordinary ballast concrete without intervening space, the same result will ensue.

Providing "Surveyor" wishes to do without wood fillets, sleepers can be formed of breeze concrete, keeping the surface not less than 1 in. above the general surface of concrete floor, and making provision for the admission and circulation of air.

In no case should floor-boards be "cut down" directly the concrete-floors are laid, and nailed down later on, as suggested by "Another Surveyor," as the boards will become saturated on the underside by the moisture emitted from the concrete during the process of drying, and when nailed down considerable shrinkage will ensue.

The most satisfactory results will be gained by allowing the concrete to dry thoroughly, or as much as possible, before the boards are laid.

"Another Surveyor" suggests that he is not sure "that coke-breeze is a safe material to place even near flues, that it is a very perfect conductor of heat, and that the heat will accumulate in it sufficiently to char any wooden skirting," which appears to me to be entirely contrary to facts.

I have used breeze concrete most extensively for years, and have put it to the severest tests in every way, and found it both a non-conductor and non-absorbent of heat, and most fire-resisting and incombustible,—in fact, much more so than ordinary ballast concrete, as if heat is applied to the latter the "aggregate" will immediately crack and fly to pieces.

I have no doubt "Another Surveyor" is cognisant of the use of "Wright's" fireproof bricks for fixing wood skirtings, &c., round fire-flues and similar situations, which have had the test of at least ten years without causing any catastrophe, and from the facts mentioned above there is no possibility of any heat from the grates or stoves being communicated to the concrete if carried into the fireplaces sufficiently to char any woodwork placed in juxtaposition.

It is admitted that breeze concrete is lighter than ballast concrete by about 25 per cent., but there is no ordinary concrete made that is water-tight, or will prevent the percolation of water through it.

The experience of "Another Surveyor" in regard to coke-breeze concrete scaling off from below the flanges of the iron joists is unfortunate, and I would suggest that, instead of using coke as an aggregate, he should use coke-breeze mixed with the usual proportion of Portland cement, and keep the soffit of the concrete at least an inch below soffit of joist; he will then find the soffit of the concrete throughout perfectly sound, which can be plastered on direct, and be thorough good work without the needless expense of battens and lathing.

I have encased girders up to 26 in. wide in a similar way with same satisfactory results.

"EXPERIENCE."

*** "Experience" is a correspondent who has a right to the signature, but we may point out that the "experience" of others is tending to show that boards may be laid on concrete with proper care, without dry-rot supervening (see as one example the letter of "C. F. M." above); and the plan of laying the boards with a space between them and the concrete, supposed to be necessary, keeps up that system of inaccessible hollows in house-building, which it is desirable on sanitary grounds to get rid of entirely.—ED.

MONUMENTS TO ARCHITECTS.

SIR,—May I, with your kind indulgence, ask through your columns whether any of your readers are aware of the names of any English architects, besides Sir Charles Barry, G. E. Street, and Professor Cockerell, who have had statues or sculptured memorials, funerary or otherwise, erected in their honour?

O. F.

BERLIN WATERWORKS.

SIR,—I venture to bring to your notice an error in your last week's "Notes." You refer to Herr Oesten as "the engineer" of the Berlin waterworks. The engineer, who has held this position ever since the waterworks were built, is Mr. Henry Gill, M.Inst.C.E., an account of whose paper on "Water-meters," read at the Institution of Civil Engineers, a few weeks ago, was published in your columns. Herr Oesten only holds the position of chief assistant-engineer. I trust you will see your way to correcting your slip of last week.

GEORGE H. GILL.

OLD TOBACCO-PIPES.—In digging ground for the foundations of the Patent Office extension buildings, an unusually large number of seventeenth-century tobacco-pipes have been found. They lay, all together, about 14 ft. deep in what had been the garden of a house in Took's-court, and close to the southern wall of the Staple Inn block, which was re-built in 1699, as the date over its doorway testifies. They are made of fine white clay, with straight stems, in some cases 12 in. long; a few are glazed, and have initial letters on the wide foot under the bowl. Whilst after the customary type of a thick stem and a deep bowl, not much larger than the stem, the pipes have bowls of varying outline, many of them, indeed, showing well-moulded shapes. Out of those we have seen a good collection could be made of these humble specimens of plastic art. In the basement of the house in Took's-court was found the ornamented leaden cistern, bearing date "1675," to which we recently referred (see the *Builder*, vol. lxi., fol. 161).

The Student's Column.

WARMING BUILDINGS BY HOT WATER.

VI.

AIR IN PIPES (*concluded*). WATER SUPPLY.

(HORTICULTURAL WORKS)

AIR tubes can be made of almost any material; copper tube, composition tube, or iron pipe. The former is very usually adopted when convenient, as it does not perish readily, and its rigid nature prevents injury by blows, which the compo pipe could not withstand. Composition pipe is, however, used to a considerable extent, owing to its cheapness, the easier way in which it can be worked (bent, &c.), and it can be more easily obtained if the material for the air-tube has to be purchased in the country. Iron pipe is sometimes used, but it entails more labour, cutting and screwing, is more clumsy looking, and no more effective than copper.

The size for the tube is small, varying from ¼ in. to ½ in., according to the engineer's ideas or requirements. A very small pipe is sufficient, in fact, a pin-hole would permit of the air escaping, but a very small hole or tube bears a risk of becoming stopped. There is one essential feature to be observed when putting up air-tubes, which is that they must not on any account be dipped anywhere in their course. That is, from the point where they are connected to the hot-water pipe upwards, they must be carried in an ascending direction. If it is necessary to carry the pipe horizontally, then it is permissible, although it would be better if it could be given an ascending direction, however slight, but on no account must the pipe descend anywhere, or its purpose will not be fulfilled.

Supposing an air-pipe was erected, as fig. 21. This would have a dip or descent in the pipe

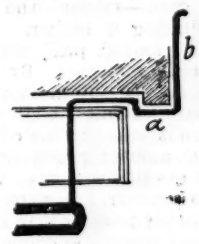


FIG. 21.

where marked *a*. Now, this dip would not be found objectionable when first charging and testing the apparatus, but when the fire had been alight some time the little vapour that escapes by this pipe would cause a collection of water to occur at *a*, with no means of removing it. This collection of water, when once formed, would afterwards prevent the escape of air that is perpetually being given off by the water as it changes temperature, and the result would be the volume of air collected becoming great enough to stop circulation by locating itself in the extremity of the water-pipes where the air-tube is connected. The common term expressing this state of affairs is to describe the pipes as being "air-locked," and this is really the case, as the collection of water at *a* will quite prevent the air passing out from *b* unless the water was heated to boiling-point, when the steam would, doubtless (depending upon the depth of the dip), effect relief. We could not, however, depend upon raising the water to boiling temperature for this purpose, and it must somehow be arranged to carry the pipe in an ascending direction and not dip it anywhere. This is always possible, the pipe being so small as to permit of its being placed anywhere without being unsightly or objectionable in any way.

This pipe is always connected to the water-pipe by a union-joint; this admits of its being simply disconnected and removed if required. It frequently happens that these pipes have to be taken down, as insects, fine leaf débris, and other substances, find a collecting-point there, sufficient to quite stop the pipe up sometimes, and this has to be removed and the pipe cleared. The air-pipes are usually terminated inside the house if convenient, they are then less liable to stoppage. If they terminate outside, care should be exercised to see that no part of the pipe containing water be placed out of the house, or the first severe frost may freeze the water within it, and be an objection in several ways.

The upper extremities of these pipes are

usually turned over, as shown at fig. 21; this assists in preventing falling matter lodging within the pipes, and so bringing about a stoppage. When two branch services of hot-water pipes terminate near one another, the air-tubes can be joined, if a saving of pipe can be so effected, but both before and after the junction the same care must be used to see that the pipes rise more or less throughout their whole extent.

WATER-SUPPLY.

It is, of course, necessary to provide some convenient means of, not only filling the apparatus when it is newly erected, but (more important) of regularly replenishing and making good the loss of water by evaporation. Sometimes a draw-off tap is inserted in the apparatus, which the gardener resorts to when warm or tepid water is required for watering purposes, but this arrangement necessitates some special provisions, and the loss by evaporation only will be spoken of first.

It is, of course, understood that an apparatus, such as which we are speaking of, with open pipes at the extremities, loses water by evaporation very freely when it is in use; the evaporation being brought about by the heating of the water, as every one is aware. If it were not for this, a simple hole at some point would suffice for the first filling, but as the subsequent loss referred to necessitates moderately frequent attention (varying with the size of the apparatus, the power of the boiler, and other circumstances), a provision must be made for convenient replenishment, and at the same time it should be arranged so that the gardener or attendant can see at a glance when water is needed.

This is all fulfilled by an ordinary supply cistern,—a square cast-iron cistern of somewhat small size, placed in any convenient spot just above the highest point of the circulating pipes. No gain,—rather the reverse,—is effected by placing it higher. By keeping it low it is easily looked into, and the want of water seen in a moment. By keeping the bottom of the supply-cistern above the highest circulating pipe, we know that the pipes are full while there is water in the cistern, however little it may be, assuming nothing is amiss with the apparatus in other respects. With a cistern placed in this manner, the water is added, as required, by simply pouring it in from a can.

The important feature in connexion with the supply-cistern is that it should bear some relation to the size of the apparatus. The reason for this is, that when the apparatus is charged, it is, of course, filled with cold water. Now water, as explained in the earlier papers, expands to a most noticeable extent when heated, and the exact extent of this expansive or swelling property is one in twenty-four when heated from freezing to boiling temperature. This amounts to an increase of bulk, so that a quantity of very cold water occupying 24 cubic inches would be found to fill the vessel to 25 cubic inches when heated to 212 deg. In the works under discussion, we do not get such extremes of temperature, and a difference of about 130 deg., viz., from 50 deg. to 180 deg., is about the maximum, and the increase in bulk in this case would be only about one in thirty-six.

The object in dwelling upon this question is to point out that if a supply-cistern be put to the apparatus, and the apparatus then charged and the fire lighted, we shall get an overflow of water when it becomes heated and expanded, unless the cistern be of sufficient capacity to allow for this increase of bulk. The proper calculation to settle the size of the cistern is to use one capable of holding one-thirtieth of the whole contents of the apparatus. (Allow a trifle over half-a-gallon for every foot length of 4-in. pipe; 10 ft. of 4-in. pipe will hold 5·433 gallons.) When the apparatus is first filled, the cold water should not reach higher than about ½ in. above the bottom of the cistern; the cistern will then nearly fill as the water reaches its highest temperature.

Some gardeners (and some engineers) do not trouble about this variation in bulk, and the allowance it necessitates; they use a small cistern, and when charging fill it up. As the water heats they let it overflow, until the expansion ceases, and the water level then remains fairly constant, unless the water cools down again. If the apparatus is one that has regular and skilled attention it may be taken for granted that the water will not cool down again until the fires are drawn in the warm weather, and not even then, if there is a tropical house being heated. It will be seen that the variation in the bulk of water is in ratio with its heating and cooling, and if the boiler fire is kept going night and day, and the water thus always kept hot, the bulk will not vary to any important extent. The expanded water will not contract so long as heat is imparted to it from the fire, which, as just stated, is not allowed to go out all the winter months, under any circumstances.

The supply cistern should always have a lid to prevent dirt, insects, and leaves from falling in and stopping the supply pipe. Dirt is very usually a conspicuous feature in these works when they have had a little use; the causes just named contribute some, but the bulk (and the quantity is large sometimes) is due to the supply water being furnished from ditches or some such rather impure source. In towns the water used is generally from a company's mains, or, at any rate, clean water is abundant, but in country places it is not so conveniently accessible for the gardener's use, and resource is had to rain or surface water. This water answers excellently, but has generally some suspended matter in it which collects at all available points in the apparatus. It is this matter when deposited in the boiler that requires removing periodically.

The supply pipe from the cistern to the radiating pipes is usually ¾ in., sometimes ½ in. but considering the short length generally required, the former size might be used in every instance. It is less likely to get stopped. This pipe should have a dip, or syphon (inverted) in it, the object of this being to prevent the heated water finding its way into the supply cistern.

In the first papers it was explained that the circulation of water by convection currents was due to the heated particles of water taking an ascending motion by the superior descending force exerted by the colder particles. Now, this action will take place in a single pipe from a boiler; the heated particles going up the centre and the cold particles descending close to the inner surface of the pipe. This action is very free, and, although of no use for practical purposes, it is quite sufficient to admit of the rapid transference of hot water from the pipes into the supply cistern, if the pipe was carried in a straight line from one to the other without the dip just referred to.

This dip as shown in fig. 22 is merely the supply pipe carried down about 6 in. or 8 in.

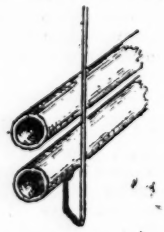


FIG. 22.

below the circulating pipes and then it ascends, entering the return pipe below as illustrated. By this arrangement, the heated water to find its way into the supply cistern would have to first take a descending and downward direction, and this it will not do; and although the supply pipe is open and clear right through, no hot water will enter it so long as the dip exists.

OBITUARY.

MR. PHILIP C. HARDWICK, F.S.A., F.R.I.B.A.—We regret to learn from the *Times* that Mr. Philip C. Hardwick died after a long and painful illness on the 27th ult. He was born in 1822, and, after having been trained under Mr. Edward Blore, he joined his father in architectural work in 1842. Among the many useful works to which he devoted himself mention may be made of the Artists' Benevolent Institution, of which he was the honorary treasurer, and to which he rendered invaluable service. He was architect to the Bank of England, to St. Bartholomew's Hospital, to the Goldsmiths' Company, to the Merchant Taylors' Company, to Greenwich Hospital, and to the Charterhouse, and was surveyor to the Portman Estate. Among his principal works are the central hall of Euston Station, added to his father's building; the Great Western Hotel at Paddington Station; the Ship Hotel, Greenwich; Adair-house; Madresfield-court; Addington-manor; and the New Charterhouse School buildings at Godalming. Besides these he designed a very large number of banks and office buildings in the City and elsewhere. He was one of the competitors selected to send in designs for the Albert Memorial, and he was also invited to compete for the Law Courts, but declined. In 1884, when the designs for the rebuilding of the War Office were under consideration, he, together with Mr. Ewan Christian, was appointed to the committee of selection as a professional adviser.

MR. JOHN E. PRICE, F.S.A.—As the *City Press* remarks, London archæologists have sustained a grievous loss by the decease, which occurred a few days ago, of Mr. John Edward Price, F.S.A., of Harvey-road, Leytonstone. Mr. Price, who was in his fifty-second year, had been in failing health for some months. He had long been a keen student of archæology, taking in this respect after his father, whom he invariably accompanied on his visits to spots where Roman and other remains had been discovered. For a long while Mr. Price was in business, but, the study of archæology proving more attractive to him, he severed his partnership, thenceforward devoting the whole of his time and attention to his literary labours. In the world of archæology he was regarded as a high authority on Roman relics in London. Mr. Price was the author of innumerable pamphlets and works bearing directly or indirectly on the hobby of his life. Possibly the work by which he will be chiefly remembered in time to come is the one he wrote nearly six years ago for the Library Committee of the Corporation the title being "An Account of the Guildhall." The deceased for a number of years had rendered substantial assistance to the Library Committee in connexion with the acquisition and arrangement of articles now on view at the Museum at Guildhall, a museum that now contains not a few of the relics which Mr. Price in the course of his life had succeeded in collecting. Some years ago Mr. Price held the post of secretary of the London and Middlesex Archæological Society.

DR. G. G. ZERFFI.—The death, in his seventy-second year, from pneumonia following on influenza, of Dr. G. G. Zerffi occurred on the 28th ult. at Chiswick. Dr. Zerffi was for upwards of twenty-four years Lecturer on Historic Ornament at the Science and Art Department, South Kensington, and was expected to have resumed his lectures from week to week since his illness. He wrote, amongst other works, "A Manual of the Historical Development of Art," "Spiritualism and Animal Magnetism," and "Studies in the Science of General History," and was a well-known lecturer on historical subjects. He was a member of the Councils of the Royal Society of Literature and of the Royal Historical Society. According to the *Times*, Dr. Zerffi was a Hungarian by birth, and took part in the Hungarian Revolution of 1848, serving as a captain in the 2nd Corps of the revolutionary army. He also edited the *Ungar*, published at Pesth. He became naturalised soon after taking up his residence in this country some forty years ago.

GENERAL BUILDING NEWS.

RESTORATION OF PETERBOROUGH CATHEDRAL.—This work, which has been in progress for the past ten years, is, says the *Leeds Mercury*, now rapidly approaching completion. The workmen have finished off the first set of stalls on the south side of the choir, and so much progress has been made that service will be resumed beneath the lantern in about a week or a fortnight. The altar will be placed as far back as the new pavement will permit, and the workmen will continue their work behind it. The new marble mosaic pavement, too, which is a gift by Dean Argles, is rapidly approaching completion. The designers,—Italian artists,—are now engaged on the second elevation eastward. The development of the pattern as it progresses shows a magnificent conception of design and colouring.

LECTURE-HALL, SALISBURY.—On the 27th ult. a lecture-hall was opened at the rear of the Congregational Church, Fisherton, Salisbury. The dimensions of the hall are 45 ft. by 25 ft. On either side are two class-rooms, 15 ft. by 15 ft. These class-rooms are shut off from the hall by movable partitions, and when these are taken away the room is capable of seating 450 persons. The hall itself will accommodate about 250. It is also intended to erect three other class-rooms and a kitchen at the farther end of the hall. The material used was red brick and stone work for the windows, with a wood-block floor and rough rolled cathedral glass. Mr. E. Witt was the builder, and the architect was Mr. Stevens, of Bournemouth.

CHURCH AND SCHOOLS, BRIGHTON.—In a limited competition for a church and schools, Florence-road, Brighton, the designs submitted by Mr. George Baines, architect, were adopted. The church will seat 524, and 154 more in a future end gallery; total, 678. The school will seat 250. There are also seven other vestries and class-rooms. The style is Late Gothic, and the walls are faced with flints, with red brick and terra-cotta dressings. The front gable of the church will be flanked by two turrets, one 85 ft. high.

PROPOSED RECONSTRUCTION OF THE FREE EAST CHURCH, ABERDEEN.—According to the *Aberdeen Free Press*, there is a proposal at present under the consideration of the congregation of the Free East

Church for the purchase of the buildings of the Free South Church, soon to be vacated by the congregation therein assembling, and by whom the church at the lower end of the Rosemount Viaduct has been erected from designs by Mr. Mackenzie, architect. It is proposed to make certain structural alterations in the Free East Church, and to convert the structure of the South Church, divided into two floors, into class-rooms, session-house, upper hall, &c. In the words of the report prepared by Mr. William Kelly, architect, who has been consulted on the subject: "The present session-houses of both churches and the vestry of the Free South Church would be removed. Within the East Church the present entrance lobby and the staircases to the gallery would be cleared out, and the area added to the church. The main entrance to the East Church buildings, as altered, would be by a porch in the centre of the north gable of the South Church, leading by a vestibule 9 ft. 6 in. wide to an inner vestibule or hall, lighted principally from the roof. Direct access from this vestibule would be had to the church and to the various halls and rooms on the ground floor. In the centre of the vestibule would be placed the staircases to the first or gallery floor, landing upon a passage 6 ft. wide, which would be carried round the vestibule at the present gallery floor level. From the passage just mentioned there would be direct access to the gallery of the church, to the large hall, and to a couple of cloak-rooms on the first floor. The structural alterations within the East Church include the formation of windows under the side galleries, the building up of the doors in the north and south walls, and the formation of a porch door at the north-east corner, corresponding with the present porch door at the vestry entrance. These alterations would greatly increase the light under the galleries, and would remove the draughts caused by the opening of the present entrance and exit doors. On the gallery floor the only structural alterations proposed are the formation of two new doorways for access, and the connexion of the church gallery passages with those of the vestibule. It is proposed to improve the whole of the seating. The number of sittings in the church would remain as at present, but the pews in the area would be widened. It is proposed to divide the remainder of the space within the South Church into two floors. The lower floor would contain office-bearers'-room, cloak-room, small hall (or session house), 28 ft. by 21 ft., and two large class-rooms, besides storage accommodation. On the upper floor would be the church hall (43 ft. square and having a height of about 20 ft.), capable of seating an audience of 350 to 400." The cost of the work is estimated to be about 2,350*l.*

SCHOOLS, WIGAN.—A new infants' school and class-rooms are to be built to the present Church Schools of St. Catherine, Whelley, Wigan. The architects are Messrs. Heaton & Ralph, of Wigan. —The Church Schools of St. Paul's, Goose-green, Wigan, are also to be largely added to and altered, under the direction of the same architects.

SCHOOLS, NORTHFLEET. — The present Board Schools being inadequate for the number of children attending, a new school is about to be erected in the High-street for 500 boys. The *Gravesend Journal* says that the Board have selected the plans of Messrs. Walford & Legg, architects, submitted in competition.

HOSPITAL, TORBAY.—The Governors of Torbay Hospital held their annual meeting on the 28th ult., and decided to accept the sum of £7,000 bequeathed to the hospital under the will of the late Miss L. A. Warrington. It has long been desired, says the *Western Morning News*, to rebuild the hospital. This will now be possible, the chief condition of the legacy being that the work shall be done after the plans and under the supervision of Messrs. Habershon & Fawckner, architects, and that one of the wards in the new building shall be named "The Lavinia A. Warrington Ward."

SANITARY AND ENGINEERING NEWS.

CRANLEIGH SEWAGE PURIFICATION.—A Local Government Board Inquiry was held on 14th ult. before Mr. T. Codrington, C.E., to consider the application of the Hambledon R.S.A. for a loan to carry out works of sewage disposal for the parish of Cranleigh, the treatment of the sewage on land having proved an expensive failure. Mr. C. Nicholson Lailey, C.E., of 16, Great George-street, Westminster, who had prepared the scheme, explained that the method of disposing of the sewage was that known as the International system, by which the sewage was first treated in tanks and then passed through polarite filter-beds.

SEWAGE PURIFICATION WORKS AT SALE.—An inquiry was held at Sale, near Manchester, on the 21st ult., by Mr. R. G. Walton, C.E., who has recently been appointed one of the inspectors of the Local Government Board. The application was from the Sale Local Board for power to purchase additional land and erect a pumping-station and large sewage purification works for the treatment of the sewage of Sale by the polarite and ferozone process of the International Water and Sewage Purification Company, Limited. The works will be of very considerable extent, and will include 2,300 square yards of polarite filter-beds. The plans have been prepared by Mr. McBeath, the Surveyor to the Local Board. Mr. Charles H. Beloe, the Consulting Engineer of the International Company, gave evidence to the effect that the plans were well adapted to carry out the process of the company.

SEWERAGE AT LLANDAFF YARD.—At a special meeting of the Cardiff Rural Sanitary Authority on the 30th ult., the tender of Mr. J. Straghan, contractor, Cardiff, was accepted for the sewering of Llandaff Yard and Maindy, for the sum of 2,743*l.* 12s. The building by-laws, as amended under the Public Health Acts Amendment Act, 1890, so as to apply to the whole of the district of the Authority, were also considered.

CLONMEL WATERWORKS.—A Local Government Board inquiry was held on the 20th ult. to consider objections from persons interested against the execution of works outside the district. The Clonmel Corporation are about to carry out waterworks at an estimated cost of 14,437*l.* The Government Arbitrator sat on Tuesday, February 2, to decide the value of the various lands required for the works. Tenders have been received for the iron pipes and valves, and the tender of the Stanton Iron Works Company, Limited, for 4,848*l.* 14s. has been accepted. The works will commence immediately. The engineer to the scheme is Mr. W. H. Radford, of Nottingham.

FOREIGN AND COLONIAL.

FRANCE.—At Pantin, near Paris, an excavation has been discovered, lined with marble slabs, in which have been found jewels, arms, a helmet surmounted by a Roman eagle, an alabaster vase, and various other objects apparently connected with the Roman occupation of Gaul.——M. Fagel, the sculptor, has just completed the monument in commemoration of the battle of Wattignies, the plans of which were prepared by M. Dutert. The monument will be inaugurated shortly.——A serious fire has destroyed the fine château belonging to M. Guishot de Lagarde, near Toulouse. The château contained a valuable library, and a rich collection of furniture and works of art.——There has been found, in the district of Chalons-sur-Marne, a sepulchre of the neolithic age, containing skeletons, flint hatchets, necklaces formed of wolves' teeth, and fossil shells of the Tertiary epoch, arrows and other weapons. ——A monument at Vannes, to Le Sage, the author of "Gil Blas," is to be inaugurated in May.——On April 3 next the Minister of Public Works is to go to the department of La Manche to open the new line of railway between Vère and Saint Lot.——It is announced that part of the ancient church of Val-les-Bains (Ardeche) has fallen.——M. Auguste Génin has been commissioned by the Minister of Public Instruction to make a journey to Mexico with the object of carrying on further researches into its archæology and ethnography.——For some days past dealers in works of art have been offering for sale pictures and studies by M. Puvis de Chavannes. These, executed about twenty years ago, have been stolen from his studio, and the artist has begged the Parisian press to put the public on their guard against purchasing such works. He intends to have all such works seized by the police as soon as information is obtained of any of them being offered for sale.——The death is announced of M. Emile Allard, a retired Inspecteur-Général des Ponts et Chaussées. —— We learn also of the decease of M. Foulhoux, architect-in-chief on the Indo-Chinese station, to whom we owe most of the work done at Saigon. He had published some interesting studies on Annamite architecture.——In the Palais de Justice at Lyons has been placed a portrait of M. Devienne, formerly first President of the Cour de Cassation. He was born at Lyons in 1802.—— The Académie des Beaux-Arts has appointed MM. Daumet and Gruzer on the committee to judge the competition opened by the town of Nantes for the construction of a museum of painting in that town. ——The committee charged to prepare a list of candidates for the chair left vacant by the death of M. Alphand has put forward, as candidate in the first rank, M. Georges Lafenestre, in the second rank M. Georges Berger, in the third M. Michel, in the fourth M. Corroyer, and in the fifth rank M. Charles Yriarte. The names follow of M. Phillippe Gilles and M. Roger Ballu. The election will have been made by the time these lines appear.

DENMARK AND NORWAY.—The new Church of Jesus in Copenhagen, to which we recently referred, has just been consecrated with great ceremony, the Danish Royal family being present, although, as yet, the exterior is not quite finished, and it will take some three years to complete the tower. It is the gift of the well-known Mecænas and philanthropist, Herr Carl Jacobsen, the Copenhagen brewer; the cost, when completed, is estimated at 50,000*l.* In front of the entrance stands a bronze cast of Michelangelo's "Moses," whilst the façade is ornamented with statues of Christ and four Evangelists. It is stated that the church, when finished, although comparatively small, will be the finest structure of its kind in Scandinavia. ——A monumental building to be used for military offices will shortly be completed in Copenhagen. It is three storeys in height, the materials used in the construction being red bricks, sandstone, and granite.——A new cement company, the Danish Portland Cement Company, Limited, has been constituted, in order to work a deposit of cement near Aalborg.——At the last meeting of the Danish Old Norse Record Society, Dr. Müller, the distinguished archæologist, presented his new work on the Bronze Age in Denmark, being an important link in Danish historical culture.——The large new Masonic Hall in Christiania is now approaching completion. Work is now carried on with the new Customs House to be built in Christiania, but with some difficulty, owing to the entrance of sea-water. ——A large market building, with fifty-six shops, has just been opened in Christiania, constructed of iron and glass. It is lighted by electricity.

MISCELLANEOUS.

LECTURES TO ROYAL ACADEMY STUDENTS ON SCULPTURE.—The following lectures have been arranged for:—Three lectures on "Archaic compared with Archaistic Sculpture," by Dr. A. S. Murray, of the British Museum, to be delivered on February 15, February 18, and February 22; and three lectures on "Michael Angelo" (continued from last year), by Professor J. H. Middleton, to be delivered on February 26, March 4, and March 7.

THE SURVEYORS' INSTITUTION.—Of the candidates who presented themselves at the Students' Preliminary Examination of the Institution, held concurrently in London and Manchester on the 26th and 27th ult., the following satisfied the Examiners: —Messrs. G. J. F. Adams, H. C. Adams, A. Arnold, P. C. Beasley, G. Beken, jun., H. O. Bell, F. R. Betenson, R. Bonella, A. Bruce, C. V. Cable, S. G. Carnell, A. S. Cartwright, J. A. Chubb, J. W. Clayton, R. W. Clutterbuck, H. L. Cowell, W. S. Cowper, H. H. Crawford, S. J. Cribb, D. B. Davies, W. J. Davies, G. P. Deeley, E. A. Deer, C. R. Finch, H. E. Folkes, J. S. Garner, H. A. Glover, C. H. Godfrey, W. Harris, W. H. Hicks, W. H. Hull, W. Jarmain,* D. H. Jeboult, W. T. Lamprill, W. B. Leane, S. B. Lee, F. P. Lightfoot, E. C. Lyons, F. C. T. Mann, A. J. Martin, T. C. Nevett, H. A. Newbronner, S. H. Page, W. H. Pain, W. Parks, J. W. Paul, J. A. Peppercorn, F. J. Phillips, F. F. Rootham, C. S. Sandford, A. S. E. Sedgwick, H. E. B. Sewell, A. P. Skeat, A. C. Skingle, A. G. Smith, R. W. Smith, A. C. Standen, C. W. Stupart, W. S. Walker, H. J. Watson, H. B. Whitby, and S. A. Wilde.

PROPERTIES FOR SALE.—In course of the Spring at the Mart, will be offered for sale (by Messrs. E. & H. Lumley) Killeen Castle, with its demesne of 1,000 acres, in county Meath. This stone-built castle was erected, according to Lewis's Topographical Dictionary of Ireland, in 1180, by Hugh de Lacy, who built also those of Clonard, Delvin, and, as some maintain, Trim, in this county. The castle, being now in good repair, was enlarged by Johnston to meet more modern requirements. King John is known to have been for a while in Meath, and at Killeen Castle they show "King John's tower" which he is said to have occupied in the year 1210. The estate, for the most part, there being no tenantry, is let at from 3*l.* to 4*l.* per acre annually for the rearing and fattening of stock. The church of St. Mary, rebuilt by Sir Christopher Plunkett (died 1445), contains ruins of ancient tombs, with figures clad in episcopal robes: Tegharne was of opinion that Killeen is identical with Colgan, famous for the burial therein of seven bishops. St. Endeus founded an abbey here, and a nunnery for his sister, St. Fanchea (Carecha), its first abbess. Joan, only daughter and heir of Sir Lucas Cusac, brought the barony of Killeen in marriage, 1403, to Sir Christopher Plunkett, whose descendant Lucas, tenth lord baron Killeen, was elevated Earl of Fingall in 1628.——By direction of Mr. Whitehead, who has established a new torpedo factory at Weymouth, his Sussex estate at Paddockhurst, in Balcombe, Worth, and Ardingley parishes. This property, valued in all at 250,000*l.*, consists of 3,000 acres, whereof one-third is under separate cultivation. The house, since enlarged, was built thirty years ago, with stone quarried on the land. A homestead, known as New House, is of Elizabeth's day, and is conjectured to have been designed by the architect of Wakehurst Place, in the neighbourhood, in Surrey.—— And on 26th inst., at the Mart, the block lately erected along the southern side of Coventry-street, Haymarket, having a frontage of 81 ft. between Arundel-place and Oxendon-street. The block includes Piccadilly-chambers on the four floors over the four shops: it is held from the freeholder for a term of which 92½ years are unexpired, at an annual ground-rent of 800*l.* The premises are severally let for an aggregate rental of 2,270*l.* per annum. This side of the street,—so named after Henry, son of the Lord Keeper, Coventry,—was pulled down in 1881–2, and with it No. 21, whereat David Wishart established himself as a tobacco and snuff dealer, by sign of the Highlander, Thistle, and Crown, in 1720. The Civil Service Stores, Haymarket, stand on the site of Coventry House. Next northwards, occupying the whole south side of Coventry-

* Passed at head of list.

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premium.	Designs to be delivered.
*Technical School Building	Heywood Corp.	20*l.* 10*l.* and 5*l.*	Feb. 15
*Pavilion to accommodate 10,000 persons..	Royal Nat. Eisteddfod of 1892	Not stated	No date

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor or Engineer.	Tenders to be delivered.
Sewerage Works	Maidstone U.S.A.	W. G. Scoones	Feb. 9
*Works and Materials	Willesden Loc. Bd.	O. Claude Robson	do.
*Pipe Sewer, Drain, &c.	do.	do.	do.
Outfall Pipe Sewer	Chester-le-Street URSA	D. Balfour	Feb. 10
New Cemetery, Penymaes	Rhyl Impt. Commrs.	R. Hughes	Feb. 11
Block of Buildings, Market-square, Merthyr Tydfil	.....	T. C. Wakeling	do.
Distillery, Glenspey, Rothes, N.B.	Proprietors	.....	Feb. 12
Road and Two Entrance Lodges	F. T. Treeby	E. H. Harbottle	do.
Culverts, Draining, and Roadmaking, near Mountain Ash, Glam.	.....	T. Roderick	do.
Public Baths, Woodside, Haley Hill	Halifax Corporation	Horsfall & Williams	Feb. 13
House and Shop, Bodmin	E. & H. G. Liddell	W. T. M. Mear	do.
Road Works	Wallsend Local Board	*Official*	Feb. 14
*Widening Railway between Spring's Branch and Wigan, &c.	L. & N. W. Ry. Co.	do.	Feb. 16
*Roadmaking and Paving Works	Bromley Local Board	do.	do.
*Pipe Sewers, &c.	Southend Local Board	P. Dodd	do.
Additions to Church, Cromdale, Inverness, N.B.	.....	Ross & Macbeth	do.
Farmhouse, Blervie Castle, Turriff, N.B	.....	Jas. Duncan	do.
*Brick Sewer, &c. Hackney Wick	London County Council	*Official*	do.
Street Improvement Works	Barton-upon-Irwell R.S.A.	C. C. Hooley	do.
*Works and Materials	Vestry of St. Margarets, &c. Westminster	G. R. W. Wheeler	Feb 16, 17 & 18

CONTRACTS.—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
*12,000 Tons Stone for Macadamising	Hull Corporation	*Official*	Feb. 17
*Road-making and Paving Works	Fulham Vestry	W. Sykes	do.
*Removal of House Refuse for One Year	St. Pancras Vestry	*Official*	do.
Road Works	Willington Quay Loc. Bd.	*Official*	Feb. 19
Fever Hospital, Langfield, Yorks	.....	J. Sutcliffe	do.
*Enlargement of P.O. Dudley	Commissioners of H.M. Works, &c.	*Official*	do.
*Public Baths	Shrewsbury Corp.	J. Johnson	Feb. 22
*Free Library	West Ham Council	Lewis Angell	Feb. 23
Electrical Conductors and Culverts	Manchester Corp.	*Official*	do.
*Palm House, Battersea Park	London County Council	do.	do.
*Erection of Schools, near Romford	Hornchurch Sch. Bd.	C. Allam	Feb. 24
*Warming and Ventilating Town Hall	Leeds Corporation	*Official*	Feb. 27
*Works and Materials for One Year	St. Pancras Vestry	W. N. Blair	Feb. 29
Enlargement of Vestry, Camborne	.....	J. P. St. Aubyn	Mar. 1
*Wesleyan Chapel, Brentwood	The Committee	F. Boreham	No date
Six Cottages, Dawlish	Miss Empson	C. Cole	do.
Farm-house, Penllyne, Glam.	D. Rees	.....	do.
Roads, Canton, Cardiff	.....	Veall & Sant	do.
Warehouse, Woodhouse, Leeds	George Lax	.....	do.
Printing Works, Cookridge-street, Leeds	F. R. Spark & Son	Harry May	do.
Six Terrace Houses, Cross Green, Otley, Leeds	W. E. Turner	A. Marshall	do.
Co-operative Stores, Low Wortley, Leeds	Co-op. Soc. Lim.	C. F. Wilkinson	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
*Surveyor	Wrotham Loc. Bd.	90*l.* &c.	Feb. 12
*Assistant Surveyor	Islington Vestry	200*l.*	Feb. 20
*Sanitary Inspector	Vestry of St. Margarets, &c. Westminster	130*l.* &c.	Feb. 22

Those marked with an Asterisk (*) are advertised in this Number. *Competitions, p. iv.* *Contracts, pp. iv., vi., & viii.* *Public Appointments, p. xxi.*

street (*prius* Piccadilly), and over against Piccadilly Hall, was Shaver's Hall, erected *circa* 1620, which, with its bowling-alleys, orchards, courts, &c., covered about 3½ acres, according to a survey made in 1650. The tennis-court cited in the survey is, perhaps, that in James-street; to which we adverted in a "Note" on July 30, 1887; nearly opposite to the doorway of "Hickford's" auction-rooms, *temp.* George I., for the Shaver's Hall ground is set out as "abutting on the Earl of Suffolk's brick wall south." Henry, fifth Lord Arundell of Wardour (*ob.* 1726), married a daughter of Colonel Thomas Panton, the gamester (*ob.* 1681) and last proprietor of Piccadilly Hall.

CONCRETE-MIXING MACHINE.—Concrete machines are frequently a part of a builder's plant used in house-building in Paris. They are usually of the vertical type, but Messrs. Coster, Rikkers, & Co., of Saint Denis, have recently introduced a horizontal machine which, it is claimed, will supply large quantities of concrete of good quality. It consists of an inclined wrought-iron cylinder supported by rollers held in the framing. The cylinder is caused to revolve by geared wheels driven by a belting from a counter-shaft. There are forty paddles inside the cylinder to cause the concrete to become more thoroughly mixed. The materials are introduced through a hopper at the upper end, and there is a suitable receptacle for the concrete at the lower end. The capacity of this machine is 654 cubic yards of concrete per day, and it is driven by a 10-horse-power portable engine. The cylinder revolves ten times per minute. The stones and cement are brought to the machine in trucks, and are shot in from a platform provided. As the trucks hold a definite quantity, no further measurement is required. The water is measured by a suitable valve.

THE LAND SALES OF 1891.—The *Estates Gazette* contains a review of the land sales effected in 1891, from which it appears that in England there has been a great falling off in the returns of sales in 1891, more noticeable in several of the home counties than elsewhere, although the average price per acre is only 2*l.* short of that of 1890; but in Scotland and Wales there was a most decided improvement in the number of properties sold, although the average prices are very low, in the former country especially, due principally to the sale of two very large estates, one of which of some 72,000 acres in Ross-shire only realising about 1*l.* 10s. per acre, which, of course, materially had the effect of lowering the averages in the other counties. The following is a statement of areas of land sold and the price realised per acre:—In England, 49,592a. 3r. 29p. sold for a total of 2,106,683*l.*, which is an average of 43*l.* per acre. In Scotland, 98,457a. 0r. 14p. fetched 425,062*l.*, or at the rate of 4*l.* an acre. In Wales, 8,663a. 2r. 15p. realised 163,337*l.*, equal to 19*l.* per acre.

THE "CROSS-BONES" BURIAL-GROUND, SOUTHWARK.—In a "Note" on July 27, 1885, we directed attention to this burial-ground in Union-street (corner of Red Cross-street) Borough. A few months afterwards, Sir James Bacon, who was then Vice-Chancellor, dismissed with costs a summons under the Vendor and Purchaser Act, 1874, *in re* Trustees of St. Saviour's Rectory, Southwark, to Messrs. Oyler. The purchasers had bought of the rectory trustees, for 2,300*l.*, what was described in the particulars of sale as "valuable freehold building-land in Union-street, Borough, occupying the large area of about 13,000 ft., adapted for a builder, contractor, timber-yard, &c." An Act of 1883, to abolish church-rates in St. Saviour's parish transferred this land from the parish "wardens" to the trustees, and empowered the latter to sell it, or grant building leases in respect thereof. Section 5 of the Act of 1884 for the prevention of building on such grounds, contains an exception of any burial-ground disposed of under any Act of Parliament; and this section was cited in the conditions of sale. The purchasers, stating they had intended to buy for building purposes, declined, on their side, to complete the sale. A summons taken out by the vendors was adjourned into court, with the result stated. Meantime the ground has been occupied by three persons, who for some while past have there carried on a sort of fair, with all latest "improvements" in shape of steam-organs and roundabouts, shooting-galleries, &c., which proved, as alleged, a source of great disturbance and annoyance to the neighbourhood. Arraigned on indictment, the defendants were found guilty at the London County Sessions, on Friday last week, fined in sums of 25*l.* and 40s., and bound over to keep the peace. The area we speak of may possibly have taken its name from a carving on the stone that formerly stood over its entrance,—see the interleaved copy of Manning and Bray's "Surrey," in the Guildhall Library. It formed a place of interment for the inmates of the licensed houses, or bordellos, on Bankside, in the liberty of the Clink, and belonged to the estate of the see of Winchester. A large number were buried here at the time of the Plague; as many as, it is said, 600 in one week. *Circa* 1708, the bishop gave a lease for three lives to the parish. A subsequent lease for three lives and sixty-one years (June 9, 1820) was enfranchised by the wardens for 3,338*l.* On October 31, 1853, two burials (the last) took place, with the prescribed service and payment of fees as in the case of consecrated ground. On November 8, 1854, the wardens granted a twenty-six and a half years' lease, at 50*l.* rent, the Vestry consenting. In 1791 were rebuilt on the southern side, the parochial schools, established, at first, in Montague-close, and then removed for a while to Angel-court.

A MONSTER BUILDING.—Chicago journals state that the Society of Oddfellows in that city has plans prepared for a building to be erected on a site in the central part of the town, 177 ft. by 120 ft. in area, and having ten stories. The central portion, moreover, will have ten additional stories, crowned with a tower, making the number here twenty-two in all. The tower portion will contain 132 offices, situated above the lower part of the building. There are to be eighteen lifts and four grand staircases. The summit of the tower, 70 ft. square, will be situated 450 ft. above the street. The two first stories will be arranged for offices. The architects who have prepared the plans of the building are Messrs. Adler & Sullivan, and its cost is estimated at 1,222,000*l.*

THE ENGLISH IRON TRADE.—The disorganisation in trade produced by the fall in warrants continues to become more pronounced. Although Scotch warrants remain stationary, both Cleveland and hematite warrants have suffered considerable reduction. Scotch makers' iron is more active, but quotations generally are lower. The North of England pig-iron trade is practically at a standstill, and in all the other crude iron centres a depressed tone is observable. Tin-plates are still quiet, and manufactured iron is only in moderate request. In the steel trade matters are a trifle brighter, and a better demand is noticeable for rails. Shipbuilders are less active, and engineers are not so busy. The coal trade generally is quieter.—*Iron.*

LIVERPOOL ENGINEERING SOCIETY.—The seventh ordinary meeting of this Society for the present session was held at the Royal Institution, Colquitt-street, on the 27th ult., Mr. John T. Wood, President, in the chair. The principal portion of the evening was devoted to an adjourned discussion upon a paper entitled "Transatlantic Lines and Steamships," read by Mr. A. J. Maginnis, M.Inst. N.A., at the previous meeting. The discussion, which was a very interesting one, dealt principally with the various improvements in the design and construction of Atlantic liners and their machinery during the last few years. The speakers included the President, Messrs. F. Hudleston, Henry H. West, T. L. Miller, Jennings Campbell, and others. Mr. Maginnis, having replied on the points raised during the discussion, a vote of thanks was accorded to him by acclamation for his paper.

THE TELFORD PARK ESTATE.—Messrs. E. E. Croucher & Co. announce in our advertisement columns the sale of a portion of the well-known Telford Park estate, which is freehold, and extends from Streatham Hill to Tooting Bec Common.

LEGAL.

CASE UNDER THE EMPLOYERS' LIABILITY ACT:

WILLETTS *v.* WATT AND CO.

THIS was an appeal from the County Court of Stafford, holden at West Bromwich, and was heard in the Queen's Bench Division on the 22nd ult., before Mr. Justice Hawkins and Mr. Justice Wills. It raised a question as to what was the meaning of the word "way" in the first section of the Employers' Liability Act. It appeared that the defendants had large works, and that there was a yard in them 50 yards by 50 ft. The surface of the yard was covered more or less with machinery and tanks, which were not always lying in the same place. In the yard there was a well which had not been uncovered for seven years, but on the day of the accident, some water being required for testing an iron cylinder, it was uncovered and left so. Half an hour later the plaintiff, while going across the yard between the bits of machinery, for the purpose of seeing whether more steam was wanted, fell into the well, which was in his direct line of way, and injured his arm and head. For these injuries he brought this action, and in the particulars, claimed damages by reason of a defect in the "ways." The jury awarded him 150*l.*

Against this judgment Mr. Hugo Young, for the defendants, appealed, and argued that no defect in

the way had been shown. "Way" meant a passage marked out in a particular direction, and there was no special or usual passage across this yard—"M'Griffin v. Palmer's Shipbuilding Company" (10 Q B.D., 1), "M'Shaen *v.* Baxter" (The *Times* Law Reports, Nov. 12, 1890).

Mr. Disturnal, for the plaintiff, argued that if the word "way" meant any defined way, then the passage traversed by the plaintiff was defined by the machinery and other obstacles he had to pass. But the word did not mean a defined way.

Mr. Justice Hawkins, in giving judgment, said—Judgment ought to be entered for the defendants on the ground that it is not a way within the section. I think, if it can be considered a way within the section, it was, under the circumstances, defective. The question is—Is it a "way connected with and used in the business of the employer?" I take Mr. Justice Field's definition in M'Griffin *v.* Palmer's Shipbuilding Company. The learned Judge, after stating the facts, continued:—In my opinion the question is, was it a way which was habitually used, or pointed out, or intended to be used as a way from one part of the works to another? "Way" does not mean every piece of ground that may be used for passage.

Mr. Justice Wills.—The word "way" does not stand alone in the Act; it is coupled with the words "connected with and used in the business of the employer." This shows the word "way" means a line of passage more or less habitually used. Under some circumstances, no doubt, a way, even though used for the first time, may come within the description in the Act. If the plaintiff's contention is correct, every line from one part of the works to another where the workmen passed would be a way. There was no evidence that this line of passage was habitually used as a way. The fact that obstacles were placed there temporarily does not define the passage as a way.—*Times.*

MEETINGS.

SATURDAY, FEBRUARY 6.

Architectural Association.—Visit to the new Metropolitan Life Assurance building in Moorgate-street, and to the tower and spire of Bow Church.

Sanitary Inspectors' Association (*Carpenters' Hall*).—Address to be delivered by Dr. Geo. Reid. 6 p.m.

Royal Institution.—Professor J. A. Fleming on "The Induction Coil and Alternate-Current Transformer." III. 3 p.m.

MONDAY, FEBRUARY 8.

Royal Institute of British Architects.—(1) To receive the announcement of the name of the person the Council propose to submit to her Majesty the Queen as the recipient of the Royal Gold Medal. (2) Mr. Edwin T. Hall on "London Building Legislation." 8 p m.

Royal Academy of Arts.—Professor Aitchison, A.R.A., on "Saracenic and Turkish Architecture." V. 8 p. m.

Society of Arts (*Cantor Lectures*).—Professor George Forbes on "Developments of Electrical Distribution." III. 8 p.m.

Clerks of Works' Association (*Carpenters' Hall*).—Paper by Mr. G. Calvert. 8 p.m.

Liverpool Architectural Society.—The Rev. F. F. Grensted on "Babylonia and Assyria as a Home of Early Literature and Science." IV. 6.30 p.m.

TUESDAY, FEBRUARY 9.

Institution of Civil Engineers.—Discussion on Mr. A. H. Curtis's paper on "Gold-Quartz Reduction." 8 p.m.

Sanitary Institute (*Lectures for Sanitary Officers*).—Professor H. Robinson on "House Drainage." 8 p.m.

Sheffield Society of Architects and Surveyors.—Mr. W. Randolph on "Town Churches." 8 p.m.

WEDNESDAY, FEBRUARY 10.

British Museum.—Miss Eugénie Sellers on "Greek Sculpture: 'Æginetan' Work." I. 2.30 p.m.

Carpenters' Hall, London Wall.—Professor W. H. Corfield on "Water Supply, Drinking Water, and Pollution of Water." 8 p.m. (*Admission Free.*)

Sanitary Institute.—Papers on "Refuse Disposal" by Mr. Charles Jones and Mr. James Russell. 8 p.m.

Society of Arts.—Mr. E. Price Edwards on "Burning Oil for Lighthouses and Lightships." 8 p.m.

Liverpool Engineering Society.—Mr. Thomas Morris on "Engineers' Tests of Iron and Steel." 8 p.m.

THURSDAY, FEBRUARY 11.

Royal Academy of Arts.—Professor Aitchison, A.R.A., on "Saracenic and Turkish Architecture." VI. 8 p.m.

British Museum.—Miss Millington-Lathbury on "Mysteries and Oracles" as illustrated by the Greek monuments in the Museum. 2.45 p.m.

Society of Antiquaries.—8.30 p.m.

Institution of Electrical Engineers.—(1) Mr. Alexander Siemens on "Some Experimental Investigations of Alternate Currents." (2) Mr. W. H. Preece on "Insulated Conductors for Electric Lighting and other purposes." 8 p.m.

Society of Arts (*Indian Section*).—Lord Lamington on "Recent Travels in Indo-China." 4.30 p.m.

Edinburgh Architectural Association.—Mr. Æneas J. G. Mackay on "The Architecture of Scottish Towns, as illustrating Scottish History." 8 p.m.

Dundee Institute of Architecture.—Mr. John Honeyman on "Glasgow Cathedral." 8 p.m.

FRIDAY, FEBRUARY 12.

Sanitary Institute (*Lectures for Sanitary Officers*).—Professor H. Robinson on "Sewage Disposal." 8 p m.

Institution of Civil Engineers (*Students' Meeting*).—Mr. H. B. Ransom on "Fly-wheels and Governors." 7.30 p.m.

Royal Institution.—Mr. G. J. Symons on "Rain, Snow, and Hail." 9 p.m.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

21,191.—PORTABLE BUILDINGS: *E. E. Allen.*—This patent relates chiefly to portable buildings. Sheets 8 ft. to 12 ft. long, and 2 ft. 6 in. to 3 ft. 6 in. wide, composed of three thicknesses of thin wood, are formed for the lining of the buildings, the grain of the central layer being arranged at right angles to the other two layers, thus making large and very strong sheets not liable to split. With the above sheets are combined sheets of galvanised corrugated iron, placing between them inodorous felt or silicate cotton, and rivetting or otherwise attaching them by turning over edges of the iron, or enclosing them in a light wooden frame. Similar sections or sheets are formed with slight modifications for the roofs and floors of the building. Compound standards are constructed as set out in the specification and are used for the purpose of securing the sections together. The inventor claims the saving of bulk and weight for transport, and time and labour in erecting the building.

3,166.—ROOFING: *J. A. Main.*—This claim is for an improved method of supporting "purlin" bars on the rafters of roofs, though the invention is also applicable to other parts of the building.

4,349.—BRICK-MAKING MACHINES: *R. Mountain.*—This is an invention referring to machines where the moulds for the bricks are made in revolving barrels. The barrel is preferably provided with several moulds, uniformly distributed over the circumference of the barrel. At one side of the barrel is provided a mixer or pug mill, into which the clay is fed, and thence pushed forward to enter and fill the moulds as they successively come opposite the mill or mixer. The bottom of the moulds are formed as moveable rectangular pistons. By means of mechanism described these pistons are moved radially in the moulds. Without the barrel a die or top piston is provided moveable within radially placed guides for the purpose of pressing the brick in the mould; and at a suitable position past this die there is a delivery table on to which the formed bricks are delivered. Mechanism for locking the barrel truly in position is also described.

12,429.—BUILDING CEMENTS: *F. J. Reynolds and J. Brown.*—This invention claims the preparation of a cement more efficient, harder, and more durable than those in ordinary use. Lime, well calcined, is incorporated with carbonate of potash and reduced to powder in the form of a hydrate, and when required for use is treated with a combined saccharine and metallic solution such as iron, copper, or other metal as described. The inventor states that mortars made of the above with any kind of hard gritty substance will harden under water.

19,754.—BRACE-BITS: *T. O. Smith.*—This patent refers to an improved adjustable attachment to brace-bits provided with an adjustable counter-sinking blade, the whole device being fixed to the bit by means of screw pins as described. The specification also describes a hole-boring and counter-sinking device for attachment to brace-bits, consisting of an adjustable block provided with a mutilated conically-shaped cutting head for counter sinking, the block being provided with a screw adjustable stop to regulate the depth of counter-sinking required.

NEW APPLICATIONS FOR PATENTS.

January 18.—939, A. Baxter, Connecting Earthenware Sanitary Appliances, &c., to Metal Pipes.—954. A. Young and R. Chesney, Lock.

January 19.—1,023, S. Middleton, Operating Window-sashes.—1,024, J. Evans, Apparatus for Utilising Waste Heat for Heating Buildings.—1,039, G. and C. Rollason, Joint for Hot-water Pipes.—1,041, S. Rollason, Generating Electricity for Buildings.—1,052, J. Chappell, Parquet and Block Flooring.—1,058, J. Schneider, Chimney-cowl.—1,062, J. Barber, Device for Curing Smoky Chimneys.—1,092, T. Brown, Chimney-pots and Tall-boys for Chimneys.—1,095, G. Williamson, Kitchen-ranges.

January 20.—H. Hansen and Others, Hoods or Cowls for Ventilating or other Shafts.—1 114, W. Copping, Bolts or Fastenings for Emergency Doors of Public Buildings.—1,121, W. Turner, Glue-pot.—1,129 A. Fowler, Automatically-flushed Water-closets.—1,132, D. Shaw, Gulley-pipes.

January 21.—1,154, W. Riley, Construction of Knobs or Door-handles, and Adjusting and Holding them upon the Spindles.—1,170, J. Leech and J. Lewis, Fastening of Sash Windows.—1,195, A. Willard, Artificial Stone, 1,196, J. Banks, Flush and other Bolts.—1,206, R. Frost, A Joint for Pipes or Tubes in Stoneware or Metal.—1,238, J. Smeaton, Water-closets.

January 22.—1,281, H. Dowty, Hot-water Pipes and Connections.—1,292, R. Browne, Fire-grates.—1,294, E Brookes, Safety Fastener for Sash Windows, when open or closed.—1,333, A. Ransome, Felling and Cutting Timber.

January 23.—1,336, R. Mooney, Earthenware Gulley-traps.—1,342, E. Hunt, Gasaliers and Chandeliers.—1,346, J. Hunt, Automatic Ventilator and Foul-air Exhauster.—1,357, H. Wethered, Ventilation of Closet-basins and Water-closets.

PROVISIONAL SPECIFICATIONS ACCEPTED.

17,105, J. Walley, Fastening of Stable-doors.—21,088 R. Roberts, Accessories for Water-closets.—21,503, G Johnson, Drain-pipe Junctions.—21,994, W Hooks, Water-waste Preventing Siphon-flushing Cistern.—22,209, J. & A. Duckett, Water-closets.—22,268, T. Sterratt Farnworth, Bricks.—22,464, S. Hawke, Fastenings for Windows and Doors.—22,492, J. Griffiths, Water-closets.—22,534, J. Radford, Siphon-flushing Apparatus.—22,610, A. & W. Gill, Paints and Lacquers.—22,773, C. Ennis, Electric Bells and Indicators.—22,793, P. Fowler, Fireplaces.—22,809, M. Williams, Oil Paints and Paint Medium.—71, W. Chesterton, Ventilator for Shop Window.—72, A. Davidson, and R. Thorn, Veneer, Fabics or Materials for Decorative Purposes.—199, S. Dix Water-closets.—337, T. Helliwell, Glazing Buildings.—364, H. Conolly, Water-closets.

COMPLETE SPECIFICATIONS ACCEPTED.

(*Open to Opposition for Two Months.*)

4,364, W. Munns, Shutter-fastening Device.—4,750, The Society Anonyme des Ardoisieres, De Deville and V. Heyden, Material suitable for Building, &c., from Waste Pieces or Débris of Slate.—4,779, T. James, Glazed Panels for Furniture and Interior Decorative Work.—5,068, F Quéry, Kilns for Use in the Manufacture of Pottery, &c., and other Similar Goods.—5,203, W. Hughes, Opening and Closing of Windows.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

JANUARY 25.—By *Surridge & Son*: 6 to 9, Curlew-st., Horsleydown, u.t. 12 yrs., g.r. 9*l.*, r. 104*l.*, 350*l.*

JANUARY 26.—By *A. Robertson*: 48 to 60 (even), Holland-st., Kennington, u.t. 7 yrs., no g.r., r. 208*l.*, 710*l.*; 27 and 28A, Richmond-st., u.t. 25 yrs., g r. 6*l.*, r. 46*l.* 16s., 170*l.*—By *Messrs. Aldridge*: 9 and 11, New-road, Selhurst, u.t. 74 yrs., g.r. 8*l.*, 65*l.*—By *T. G. Wharton*: F.g.r. of 34*l*, with reversion in 36 yrs., Bromley-by-Bow, 860*l.*—By *Arber. Rutter, & Waghorn*: 16, Wilton-cres., Belgravia, u.t. 32 yrs., g.r. 1*l*, r. 315*l*, 4,100*l*.—By *Orgill, Swann, & Orgill*: "The Farmer's Arms," Amlwch, Anglesea, u t. 12 yrs., g.r. 20*l.*, 50*l.*; "The Clarendon Arms," Beer House, Birmingham, u.t 6 yrs., at 50*l.*, 110*l.*; "The Junction Inn," and 40 to 45, Cromwell-st., f., Dudley, Worcester, 950*l.*; "The Bridge Inn," Swindon, u.t. 2 yrs., at 30*l.*, 30*l.*; 81 and 82, Heath-st., and "The Forge Hammer" Beer House, f., Wolverhampton, 520*l.*

JANUARY 27.—By *J. A. & W. Tharp*: 1 to 9, Beaconsfield-ter., Leytonstone, f, r. 226*l.*, 2,865*l.*; 9 to 12, Barclay-ter., f., r. 119*l*, 1,335*l.*; 1, 2, 9, and 10, Denmark-ter., f., r. 125*l.*, 1,290*l.*; 2 to 7, Layspring-ter., f., r. 183*l.*, 2,000*l.*

JANUARY 28.—By *Henry & Latchford*: 28, Harrington-gardens, Kensington, u.t. 90 yrs, g r. 2*l*, 3 010*l.*—By *C. C. & T. Moore*; 90, Red Lion-st., Wapping, f., 300*l.*—By *Newbon & Co.*: 41, Colebrooke-row, Islington, f., 800*l.*; 3, Highbury-grange, Highbury, u.t. 26 yrs., no g.r., 550*l.*; 52, Highbury-pk, u t. 27 yrs., g.r. 20*l.*, r. 90*l.*, 510*l.*; 18, Lupton-st., Kentish Town, u.t. 75 yrs., g.r. 7*l.* 7s., r. 42*l.*, 360*l.*; 18, Almington-st, Hornsey-rise, u.t. 78 yrs., g r. 6*l.* 15s., r. 33*l*, 300*l.*—By *Stimson & Sons*: No. 23, Clapham-common, u t. 21 yrs., g.r. 2*l.* 5s., r. 100*l.*, 690*l.*; 4, Southborough-rd., Hackney, u.t. 50 yrs., g.r. 5*l.*, r. 28*l.*, 275*l*; 6 and 8, Southborough-road, u.t. 50 yrs., g.r. 2*l.*, r. 56*l.*, 650*l.*; 1 and 2, Rosemary-cottages; and 18, 20, and 22, Diamond-st., Camberwell, u.t. 56 yrs., g.r. 18*l.* 10s., r. 93*l.* 12s., 455*l.*; 137, Avondale-sq., Old Kent-rd., u.t. 63 yrs, g.r. 5s., 370*l.*; 6, Wansey-st., Walworth, u.t. 56 yrs., g r. 5*l.* 5s., 380*l.*; 52 and 54, Knowles Hill-cres., Lewisham, u.t. 81 yrs., g r. 11*l*, 220*l*; 4 and 5, Edith-villas, Lower Tooting, u.t. 89 yrs., g.r. 12*l.*, 160*l.*

JANUARY 29.—By *Jones, Lang, & Co.*: No. 77, Bishopsgate-street Without, f., r. 100*l*, 1,230*l.*—By *F. J. Bisley*: 16, Hadland-st., Rotherhithe, u.t. 64 yrs, g.r. 2*l.* 5s, r. 24*l* 14s., 240*l.*; 5, Adam-st., f., r. 15*l.* 12s., 180*l.*

[*Contractions used in these lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; l.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.

PRICES CURRENT OF MATERIALS.

TIMBER.		
Greenheart, B.G. ton	9/0/0	0/0/0
Teak, E.I... load	9/10/0	15/0/0
Sequoia, U.S. ft.cu.	2/3	3/0
Ash, Canada load	2/10/0	4/0/0
Birch, do.	3/0/0	4/5/0
Elm, do.	3/10/0	4/15/0
Fir, Dantsic, &c.	2/0/0	3/10/0
Oak, do.	2/10/0	4/10/0
Canada.....	5/0/0	7/0/0
Pine, Canada red	2/10/0	3/10/0
Do, yellow	2/10/0	5/0/0
Lath, D'ntsic, fath	5/5/0	6/10/0
St. Petersburg	5/10/0	7/10/0
Deals, Finland, 2nd & 1st std 100	8/10/0	10/10/0
Do, 4th & 3rd..	7/10/0	8/10/0
Do. Riga	6/10/0	8/0/0
St. Petersburg, 1st yellow ..	10/10/0	15/0/0
Do. 2nd yellow	8/10/0	10/0/0
Do. white	7/0/0	10/10/0
Swedish	7/15/0	16/0/0
White Sea	8/10/0	17/10/0
Canada, Pine 1st	19/10/0	25/10/0
Do. do. 2nd....	14/10/0	16/10/0
Do. do. 3rd, &c.	6/10/0	10/10/0
Do. Spruce, 1st	8/10/0	11/0/0
Do. do. 3rd & 2nd.....	6/10/0	8 0/0
New Brunswick	7/0/0	7/10/0
Battens, all kinds	3 10 0	15/10/0
Flooring Boards, sq., 1 in. prep. 1st	0/8/6	0/14/6
Do. 2nd.....	0/7/6	0/11/3
Other qualities	0 5/3	0/8/0
Cedar, Cuba ..ft.	/3½	/4½
Honduras, &c.	/3½	/4½
Mahogany, Cuba.	/4½	/6½
St. Domingo, cargo av	/4½	2 0
Mexican do. do	/4	/5
Tobasco do. do	/5½	/7
Honduras do..	/5½	/6½
Box, Turkey ton	4/0/0	13/0/0
Rose, Rio.....	10/0/0	20/0/0
Bahia	9/0 0	18/0/0
Satin, St. Domingo ....ft.	0/0/9	0/1/3

TIMBER (*continued*).		
Satin, Porto Rico	0/0/10	0/1/6
Walnut, Italian..	0/0/3½	0/0/7
METALS.		
IRON—Pig, in Scotland .....ton	2/3 0	2/3 3
Bar, Welsh, in London.....	6/0/0	6/10/0
Do. do. at works in Wales	5/10.0	6/0 0
Do. Staffordshire, in London	6/5 0	6/15/0
COPPER—British, cake and ingot	47/10.0	48/0/0
Best selected ..	48/10/0	49·0/0
Sheets, strong..	57/0 0	58/0/0
Chili, bars	44 8/9	44/16 3
YELLOW METAL lb.	0 0/5½	0/0/5¾
LEAD—Pig, Spanish....ton	10/12/6	10/15 0
English, com. brands	10/17/6	11/0/0
Sheet, English, 3 lbs. per sq. ft. and upwards ..	12 10 0	0/0/0
Pipe	13.0 0	0/0/0
ZINC—English sheet .....ton	25.10 0	0/0/0
Vieille Montagne.....	26/0 0	0/0/0
TIN—Straits	80/10.0	84/17/6
Australian	84 12/6	90 2/6
English Ingots	93 5/0	93 10/0
OILS.		
Linseed .....ton	19 0 0	19.15/0
Cocoanut, Cochin	26 5/0	0/0/0
Do. Ceylon.....	23 0/0	0 0/0
Palm, Lagos	23/10 0	0/0/0
Rapeseed, English pale	28/15 0	0/0/0
Do. brown	27/0/0	0/0/0
Cottonseed ref...	18.5 0	0/0/0
Oleine	0/0/0	0/0/0
Lubricating, U.S.	4/10/0	5/10/0
Do. refined	6/0 0	11/0/0
TAR—Stockholm barrel	0/19/0	1 0/0
Archangel	0/12/6	0 0 0

TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *noon on Thursdays.*]

ANERLEY.—For decorative repairs to 14, Anerley-park, for Mr. F. A. Bell :—
T. W. Jones, Beckenham £120 0 0
[No competition.]

CHELSFIELD (Kent).—For re-building shop, house, and premises, after fire, at Pratt's Bottom, Chelsfield, Kent, for Mr. G. Osgood. Mr. St. Pierre Harris, architect and surveyor, 1, Basinghall-street, E.C. ;—

T. Knight	£979 0	R. A. Lowe	£953 0
F. Wood	963 0	W. Owen, Farnborough*	798 10

* Accepted.

CRICKLEWOOD.—For the erection of new Congregational schools, Cricklewood, for the Committee. Messrs. Spalding & Cross, architects and surveyors, 15, Queen-street, Cheapside, E.C. :—

Balaam Bros.	£2,020	E. Toms	£1,741
W. & H. Castle	1,973	J. Allen & Sons	1,740
Elthwaite & Son	1,877	Gould & Brand	1,707
Aitchison	1,793	Neave & Neave	1,680
Lorden & Son	1,787	Rowe Bros., Camden-town	1,590

GREAT YARMOUTH.—For additions to Cobholm Island Boys' School, for the Great Yarmouth School Board. Messrs. Bottle & Olley, architects, Great Yarmouth :—

M. Barnard	£1,330 0 0	R. Davy	£1,241 15 6
R. Eastoe	1,319 8 0	Rand & Cooper	1,211 0 0
G. T. Flaxman	1,310 0 0	Grimble & Watts	1,209 0 0
T. Howes	1,297 9 0	G. W. Beech	1,208 0 0
J. H. Hawes	1,250 0 0	J. S. Cooper	1,197 15 0
W. H. Larkins	1,245 5 0	J. Leggett, Great Yarmouth (accepted)	1,192 0 0
G. Beckett	1,245 0 0		

LONDON.—For alterations and additions to "Lynmouth," Tulse-hill, for Mr. J. Fitter. Mr. E. Crosse, architect, 32, Bermondsey-square, S.E. :—
T. W. Jones, Beckenham £287 0 0
[No competition.]

NORTHALLERTON.—Accepted for the construction of two reservoirs, &c., in Oak Dale, and a service reservoir at the Northallerton Waterworks for the Local Board. Mr. A. M. Fowler, engineer, 1, St. Peter's-square, Manchester :—
Contract No. 1 : *Cast-Iron Pipes.*
The Clay Cross Company, Clay Cross £3,387 0 0
Contract No. 2: *Pipe-laying.*
Joseph Goldsbrough, Chester-le-Street, Durham £1,493 5 7

ORPINGTON (Kent).—For the erection of a shop and house and three cottages at the "Chislehurst-road," Orpington, Kent, for Mr. James Cox. Mr. St. Pierre Harris, architect and surveyor, 1, Basinghall-street :—

W. Owen	£938	T. Knight	£815
F. Wood	865	Somerford & Son, Clapham and Orpington (accepted)	697
C. Stebbings	845		

ORPINGTON (Kent).—For addition and alterations to the Wellington-road School, Orpington, Kent, for the Orpington School Board. Mr. St. Pierre Harris, architect, 1, Basinghall-street, E.C. Quantities by Messrs. C. Stanger & Son :—

R. A. Lowe	£2,683 0	Holt & Son	£2,492 0
Grubb	2,673 0	Stebbings	2,481 0
Laurence & Son	2,625 0	Mid-Kent Building Co.	2,352 0
Staines & Son	2,598 0		
Smith & Son	2,579 0	Graty	2,339 0
White & Son	2,565 4	Rick	2,248 0
W. Wallis	2,536 13	Martin & Co.	2,229 0
Duthoit	2,535 0	Somerford & Son	2,216 0

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INTENDING EXHIBITORS are reminded that the DATE fixed for the receipt of APPLICATIONS for SPACE, is FEBRUARY 29th, 1892. After that date applications can only be received subject to space being available. All enquiries should be addressed to the Secretary of the Royal Commission for the Chicago Exhibition, at the Offices of the Society of Arts, John-street, Adelphi, London, W.C. where Prospectuses and forms of Application can be obtained.

HENRY TRUEMAN WOOD, Secretary.

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31 and 32, Bedford-street, Strand, W.C.
London, February 2nd, 1892.

Notice is hereby given that the EIGHTH ORDINARY GENERAL MEETING of the above-named Institute will be held at the Registered Offices of the Institute, 31 and 32, Bedford-street, Strand, London, on the 9th day of FEBRUARY, 1892, at THREE o'clock p.m. for the purpose of receiving the Report of the Council and Statements of Account, for electing officers for the ensuing year, and transacting any other business which may be transacted at an Ordinary Meeting.

By order,
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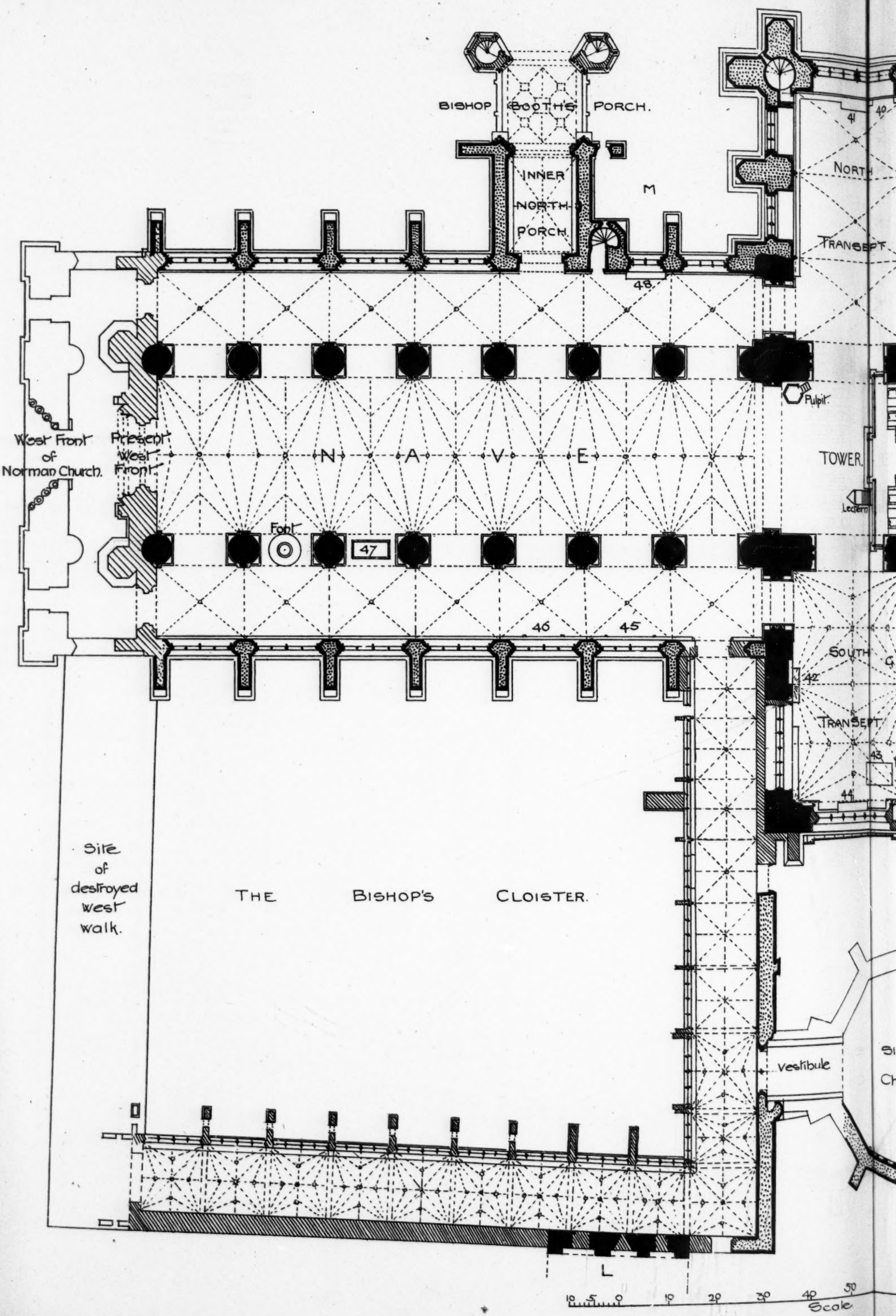

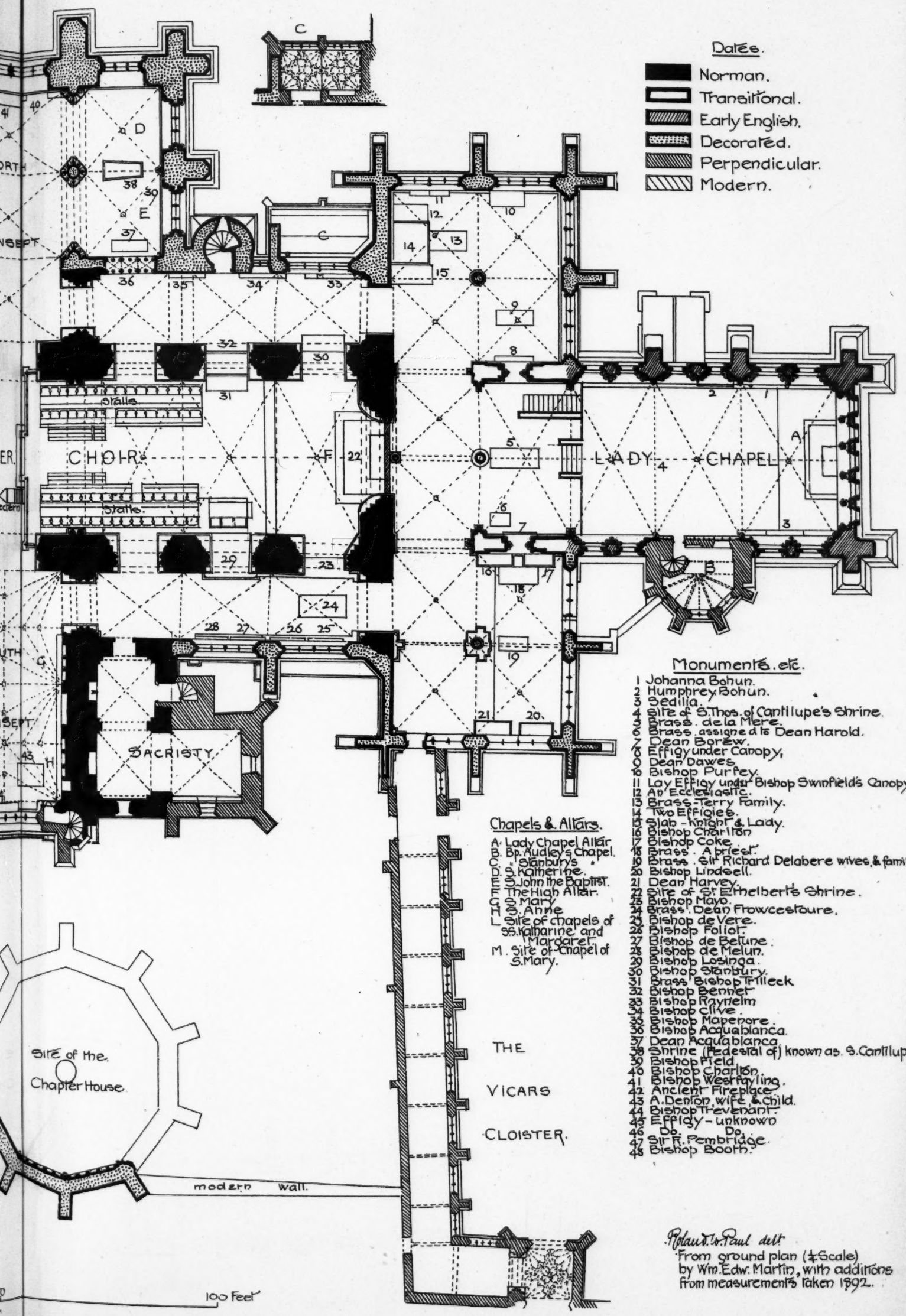

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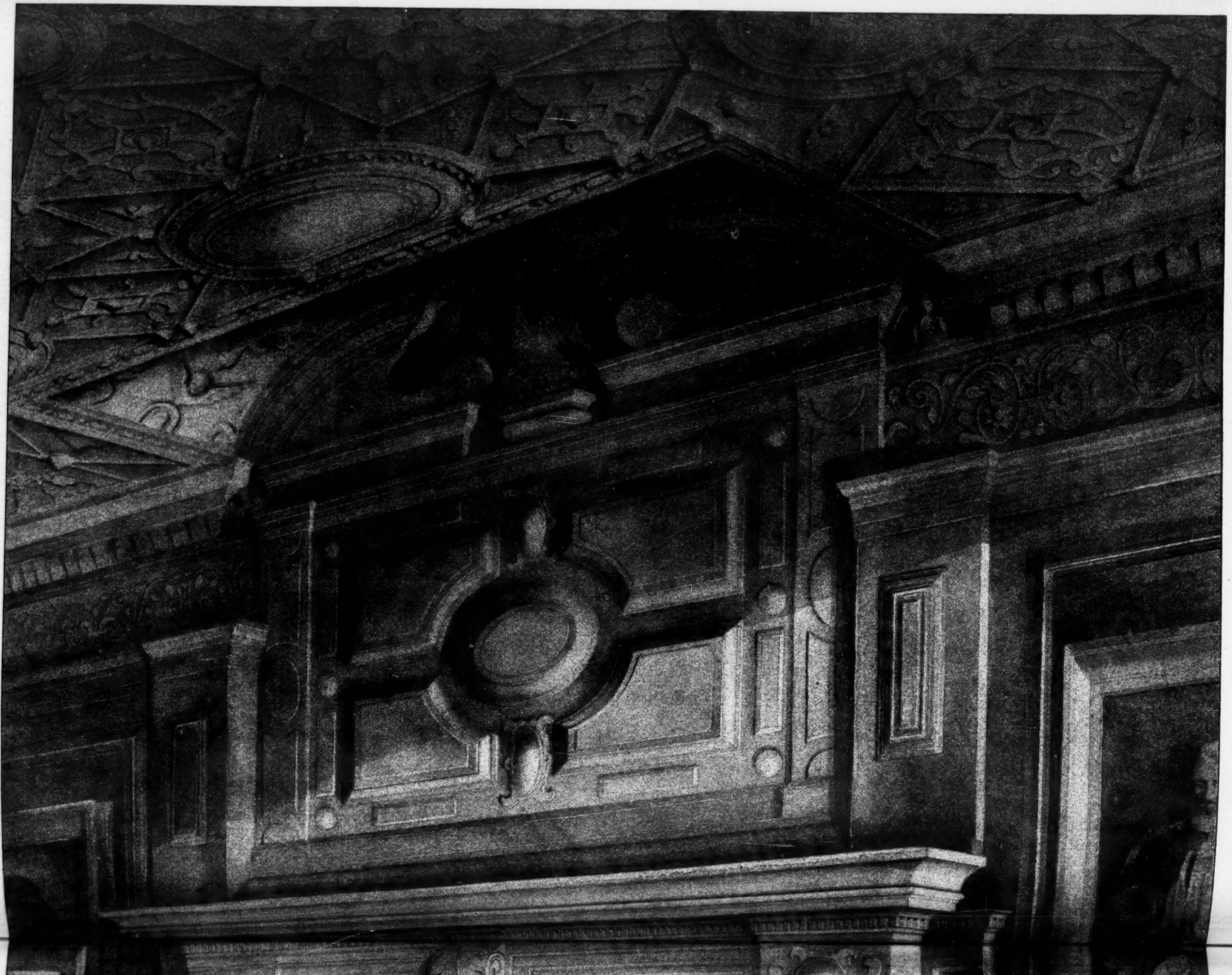

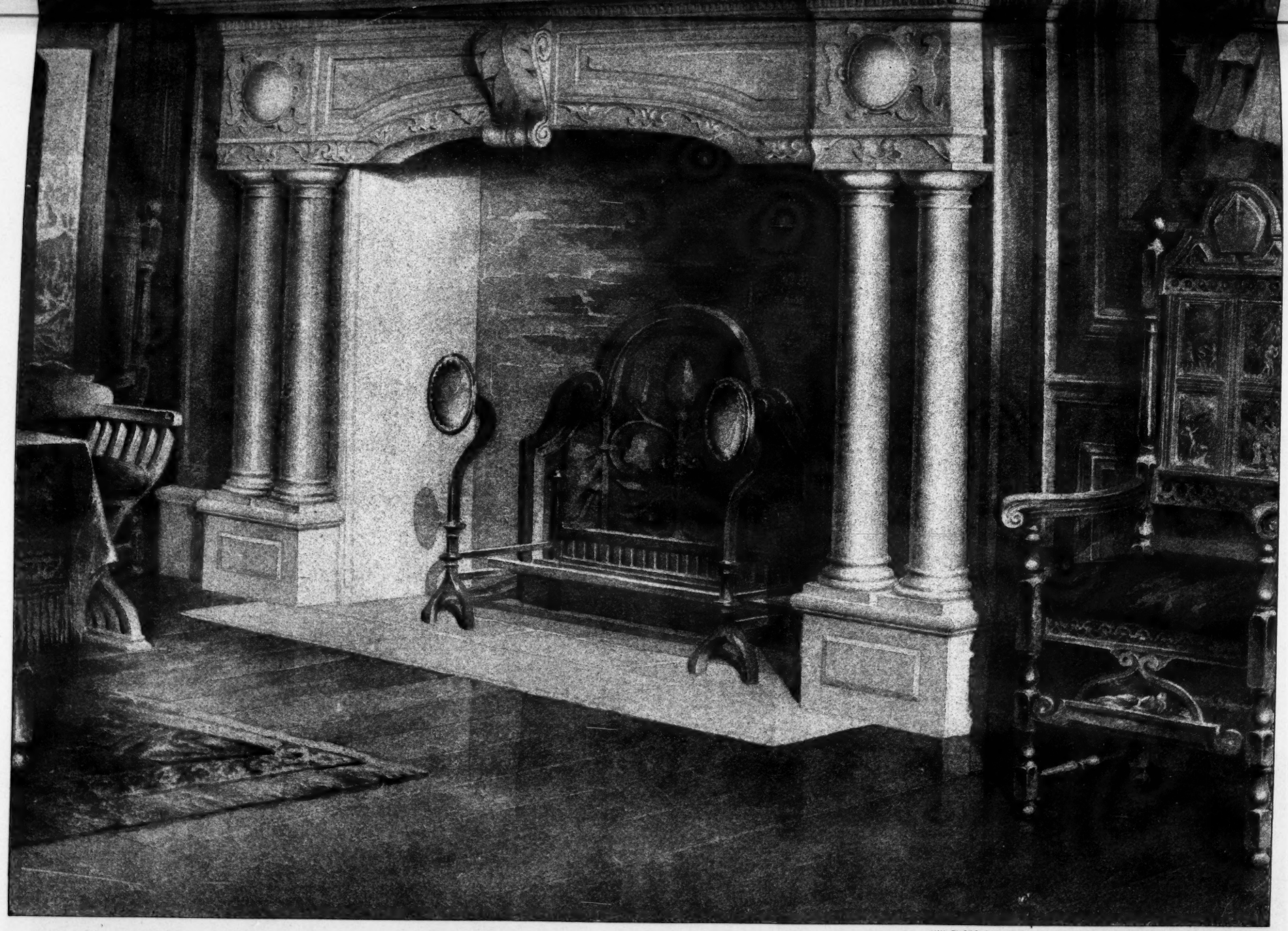

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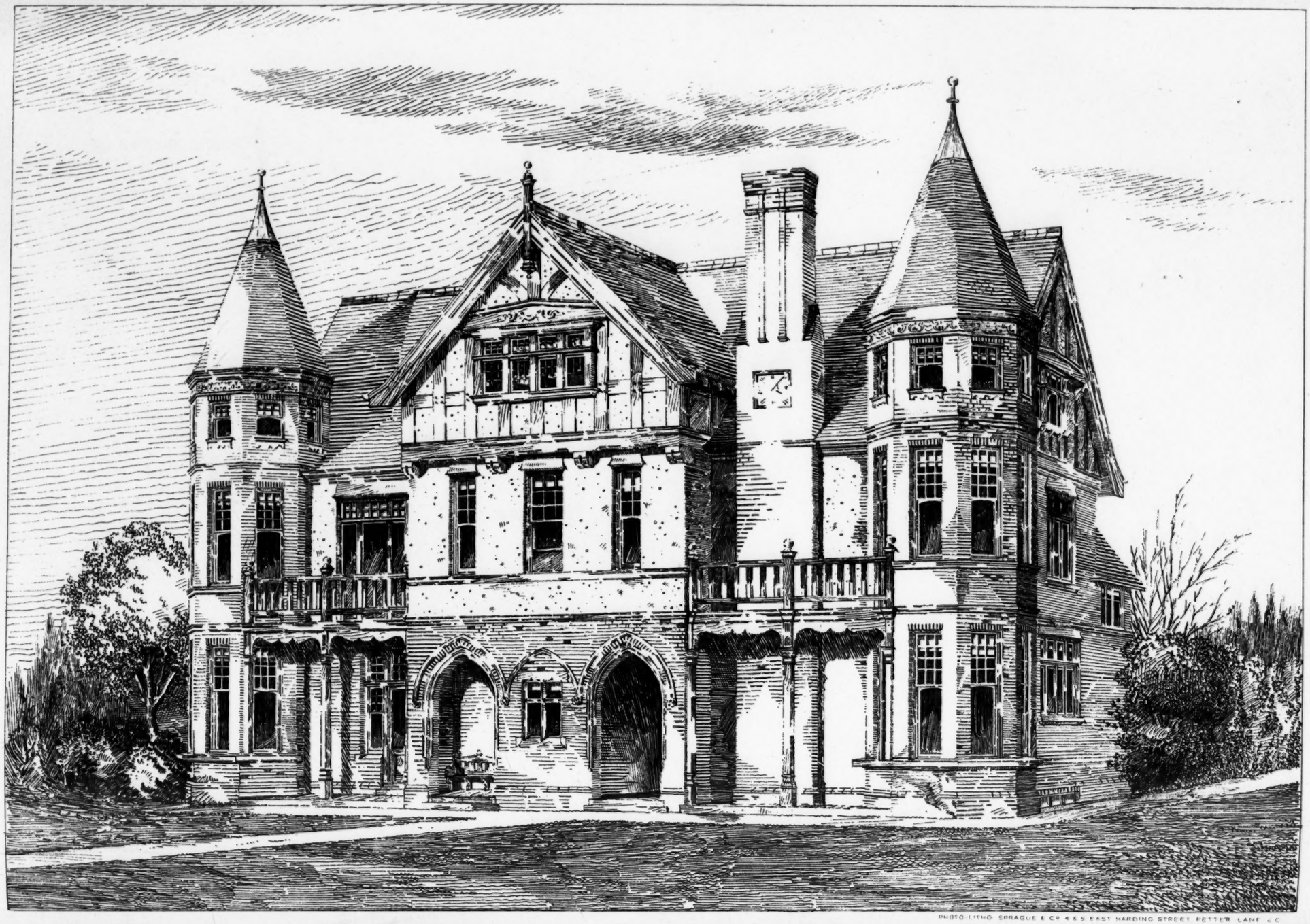

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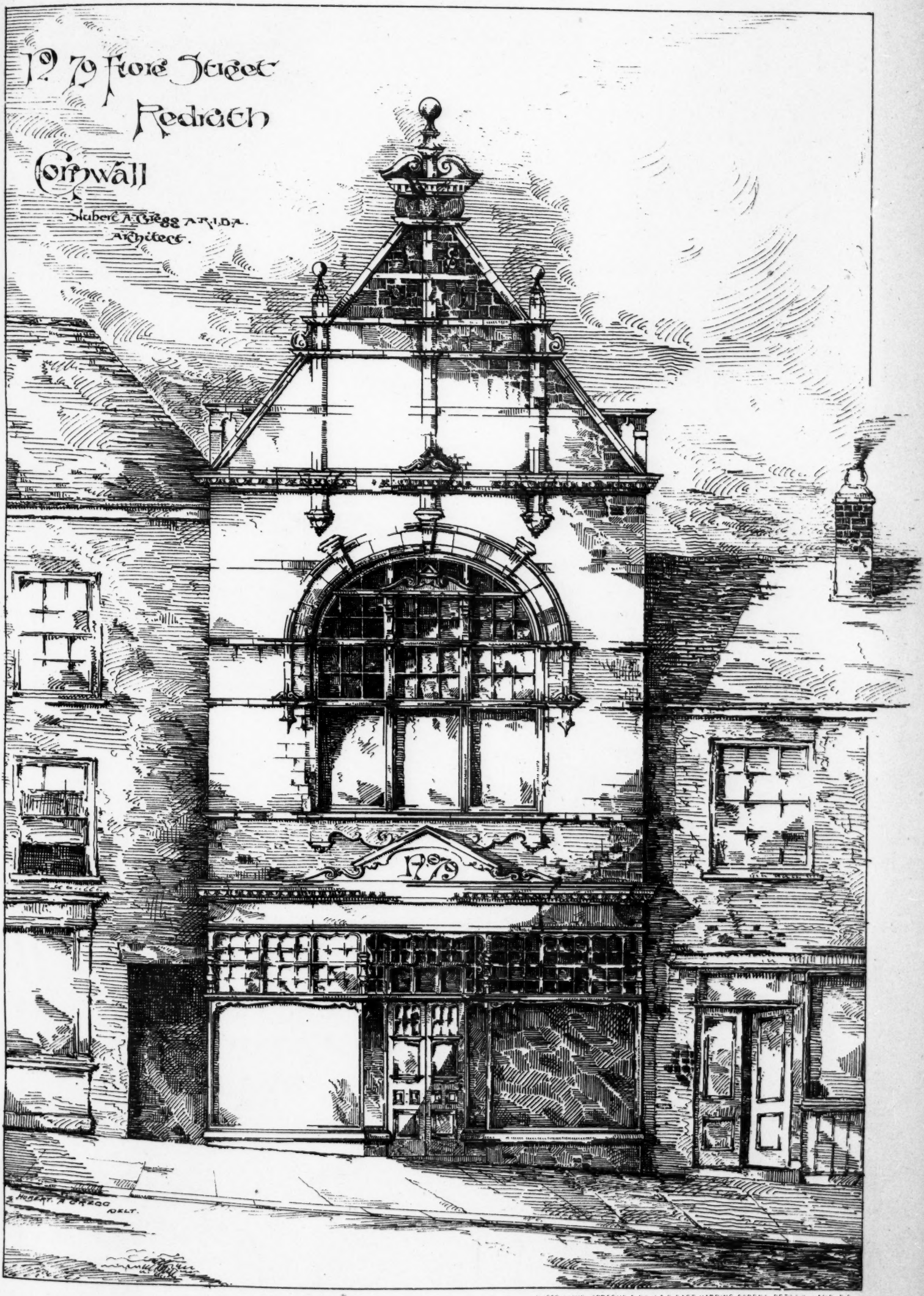

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